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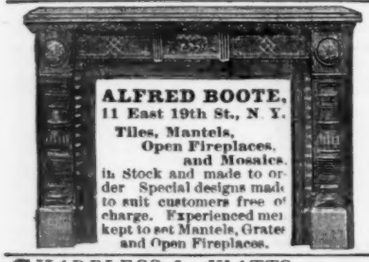

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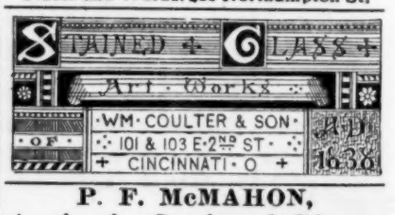

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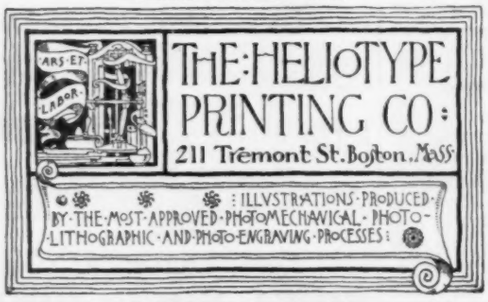

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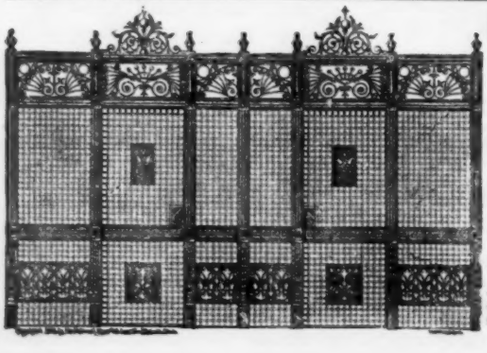

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We have recently furnished the new

Board of Trade and Royal Insurance Buildings,

of Chicago, Ill., with Iron and Brass Elevator enclosures, to which we point as a standing reference. Write for estimates and particulars.

Keep Your Walls Dry.

A New Cornice Gutter,

In Wood or Metal, set on furs, with a space behind for over-flow water.

Patented May 12, 1885, BY

DUDLEY NEWTON,

ARCHITECT,

Bellevue Ave., Newport, R. I.

Permits to use on any building can be obtained on payment of a royalty of $10. for each. Apply to the Patentee.

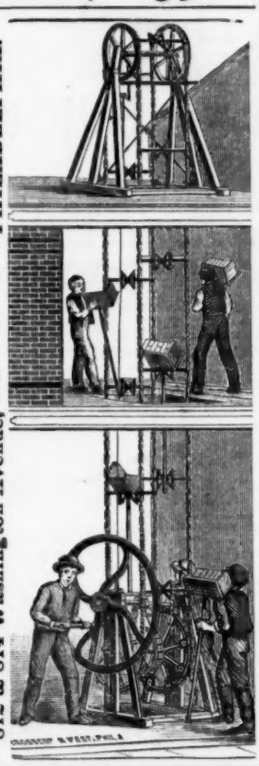
Infringements Prosecuted.

Elevators.

E. BREWER,
Hydraulic, Steam, Belt, and Hand
ELEVATORS, For Freight and Passengers.
267 Federal St., Boston. 149 Broadway, New York.
Send for Circular.

M. B. SWEZEY,
Manufacturer of
IMPROVED DUMB-WAITERS
For Dwellings, with Automatic Catch.
120, 20th St., Chicago, Illinois.

SMITH & NICHOLSON PATENTS.
Something New in HOD ELEVATORS.
50,000 Bricks and the required Mortar per day on 7th Story — The Speediest, Cheapest, Safest method of Elevating Material known. *Send for circular to*
THE NATIONAL HOD ELEVATING CO., (LIMITED.)
812 & 814 Washington Avenue, - - - PHILADELPHIA.



Troy Laundry Machinery Co.,
LIMITED. TROY, N. Y.
Salesrooms: New York and Chicago.

The most complete line of machinery for hotels and Public Institutions. Complete laundries for Institutions our specialty.
Estimates furnished. Send for Illustrated Catalogue.

American Fire Insurance Co., Phila.

CASH CAPITAL	400,000.00
Reserve and Liabilities	1,070,610.92
Surplus	447,821.13
Total Assets Jan. 1, 1886.	1,918,432.05

WIRE LATHING,

ESPECIALLY ADAPTED TO
Public Buildings, Private Residences, Mills, Warehouses, Stores, and all Mercantile Structures.

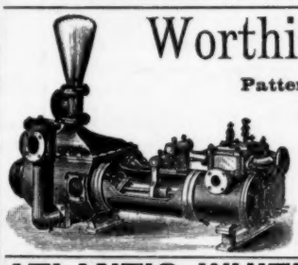
IT IS POSITIVELY FIRE-PROOF.

WIRE LATHING possesses the following qualities:

IT IS NOT COSTLY.
IT IS EASILY AND CHEAPLY APPLIED.
PLASTERING ON THE WIRE LATH WILL NOT CRACK.
THE LATH WILL NOT CORRODE.

The plastering, when applied, clinches on both sides of the wire, forming a double surface.
THE WIRE LATHING is extensively used by the United States Government in its Custom House, Court House, and Post Office Buildings.
It is indorsed by the leading Insurance Companies, who have applied it to their own fine edifices.
Full information given on application to the

CLINTON WIRE CLOTH CO., Clinton, Mass.
59 Beekman Street, New York. 137 Lake Street, Chicago.



Worthington Steam Pumps.

Patterns specially adapted to
HOUSE TANK SERVICE
And Hydraulic Elevators.
ABSOLUTELY NOISELESS.
HENRY R. WORTHINGTON - New York.
BOSTON, CHICAGO, ST. LOUIS, CINCINNATI, CLEVELAND, SAN FRANCISCO, PITTSBURGH.

ATLANTIC WHITE-LEAD & LINSEED-OIL CO.,
MANUFACTURERS OF

"ATLANTIC"
PURE
WHITE LEAD,
—AND—
Pure Linseed-Oil,
Raw Refined and Boiled.

ATLANTIC WHITE LEAD PURE WARRANTED ROBERT COLGATE & Co. TRADE MARK

The best and most reliable
White-Lead made,
And unequaled for
Uniform
Whiteness,
Fineness,
and Body.

ADDRESS,
Atlantic W. Lead & Lin. Oil Co.,
287 Pearl St., NEW YORK.

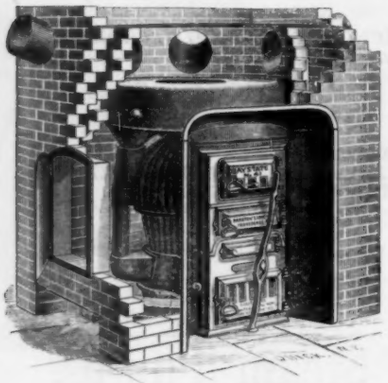
BUILDING MATERIALS.

Reported for the American Architect and Building News.

BRICK.—₱ M.	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago.	Philadelphia
Common: *Cargo afloat.*				
Pale	@ $5 00	Eastern	Building Brick	Sq. Hard @ 10 00
Jersey	7 50 @ 8 00	Bay State Hard	9 00 @ 10 00	" @ 8 00
Long Island	8 50 @ 9 00	Domestic Com.		Salmon @ 6 00
Up River	8 25 @ 8 75	Domestic Face	Indiana Pressed	Sq. " @ 8 00
Haverstraw Bay	8 50 @ 9 00	Philadelphia	16 00 @ 22 00	Light Stretchers
" 1st	9 00 @ 9 25	Philada. mould	St. Louis Fronts	@ 10 00
Hollow	@ 13 00		@ 27 00	Medium " @ 11 00
Fronts:		Glens Falls		Red " @ 12 00
Croton, Brown	12 00 @ 14 00	Glens Falls		Dark " @ 14 00
" dark	12 00 @ 15 00	Mould.		Pressed
" red	12 00 @ 15 00		22 00 @ 29 00	22 00 @ 24 00
Chicago pressed			65 00 @ 350 00	Best Paving
Chicago Moulded			@ 50 00	@ 15 00
Baltimore	37 00 @ 41 00		@ 45 00	Second " @ 12 00
Glens Falls — white	30 00 @ 35 00		38 00 @	Third " @ 11 00
Philadelphia	24 00 @ 25 00		25 00 @	
Trenton	24 00 @ 25 00		60 00 @ 100 00	
Milwaukee			30 @	
Moulded:			35 @	
Clark's Glens Falls — Red	25 00 @ 27 00		55 00 @ 65 00	
" — White	30 00 @ 35 00			
White " Mold,	45 00 @ 60 00			
Enamelled: *Imp.*				
Enamelled (edge.)	85 00 @ 100 00	@	@ 100 00	Dom. @ 65
Enamelled (edge and end)	90 00 @ 115 00	@	@ 120 00	@ 85
CEMENT, LIME, etc.—(₱ *cask.*)				
Rosendale Cement	1 00 @ 1 10	@ 1 50	*Not Sold.*	1 15 @ 1 50
Louisville "			1 05 @ 1 30	Book, Shoobridge
Utica, Akron, Buffalo, Milw'kee.	*Not sold.*	*Not sold.*	1 00 @ 1 25	2 85 @ 3 25
Portland, English (Gibbs)	2 50 @ 3 10	@ 3 00	3 25 @ 3 40	2 85 @ 3 25
" " (K. B. & S.)	2 75 @ 3 10		3 25 @ 3 50	2 85 @ 3 25
" " (Burham)	2 50 @ 2 80		3 15 @ 3 35	2 85 @ 3 25
" " (White's)	2 65 @ 3 00			
" French (Lafarge)	3 50 @ 4 50	*Not sold.*	3 75 @ 4 25	Hemmoor
" German (Alsen)	2 75 @ 3 15	3 00 @ 3 50	3 25 @ 3 50	2 85 @ 3 25
" " (Fewer)	2 45 @ 2 70	3 15 @ 3 35	3 15 @ 3 35	2 65 @ 3 00
" " (Vorwohler)	2 50 @ 3 25		3 00 @ 3 25	Jonson
" " (Lagerdofer)	2 25 @ 2 55	*Not sold.*	3 00 @ 3 25	2 65 @ 3 00
" " (Dyckerhoff)	2 75 @ 3 15	3 00 @ 3 50	3 25 @ 3 50	2 85 @ 3 25
" " (Hanover)	2 50 @ 3 00		*Not Sold.*	2 85 @ 3 25
" American (Saylor's)	2 15 @ 2 30	2 15 @ 2 50	2 75 @ 3 00	2 50 @ 2 75
Roman	2 75 @ 3 00	@ 3 20	2 75 @ 3 25	3 00 @ 3 50
Keene's coarse	5 00 @ 6 50	@ 7 50	7 00 @ 7 50	6 50 @ 7 00
" superfine	8 75 @ 11 00	@ 11 50	11 00 @ 12 00	11 50 @ 12 00
Lime:				
Lime of Teil	@ 5 00		*Not sold.*	White Lime
Hydraulic Lime	@ 1 45	@ 145		28 @ 85 ₱ bush.
Chicago Lime in bulk			60 @ 65	White Mash
Wisconsin "			75 @ 85	1 25 @ 150
Rockland and Rockport, (Com.)	@ 1 00	@ 1 15	*Not sold.*	1 00 @ 1 00
Rockland and Rockport, finish	@ 1 20	@ 1 20	*Not sold.*	
State, com. cargo rates (nom.)	@ 90	*Not sold.*	*Not sold.*	*Not sold.*
State, finishing "	@ 1 10	*Not sold.*	*Not sold.*	*Not sold.*
Plaster of Paris (calcined)	@ 1 25	1 65 @ 1 90	@ 1 75	1 25 @ 2 25
" (casting)	@ 1 45	@ 2 25	@ 1 75	1 75 @ 2 50
Hair (Cattle) ₱ *bush*	21 @ 25	@ 30	20 @ 25	22 @ 30
" (Goat)	30 @ 35	@ 30	35 @ 40	30 @ 35
Sand, ₱ *load*	1 00 @ 1 25	1 00 @ 1 75	100 @ 1 25	@ 1 50
STONE. (₱ *cubic foot, rough.*)				
Granite: (*Maine*)		@ 60		55 @ 65
Limestone:				
Bedford	@ 1 00	95 @ 1 00	50 @	80 @ 90
Joliet			35 @ 55	
Lemont			35 @ 60	
Serpentine			80 @ 90	4 50 ₱ Perch.

(Continued on page vi)

BARSTOW STOVE COMPANY,



Established 1836.

Manufacturers of Wrought-Iron, Cast-Iron and Steel-Plate

Furnaces,

Cast and Wrought-Iron

RANGES.

Send for our Illustrated Catalogue and prices of Ranges, Furnaces, etc. Also our Pamphlet, "Fireside and Kitchen, Ancient and Modern."

BARSTOW STOVE CO.,

230 Water St., New York. 56 Union St., Boston. Providence, R. I.

BUILDING MATERIALS.

	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago.	Philadelphia.
Foundation:				
Dimension	@	5 00 ℙ ton	20 @ 28	1 45 @ 2 50
Block	@	4 60 ℙ perch	8 50 ℙ cord.	Conshocken
Rubble	@	1 25 @ 1 50	8 50 @	1 45 @ 2 50
Bluestone: (ℙ *sq. ft.*)				
Sidewalk	30 @ 5 00	40 @ 1 75	75 @ 1 00	1 in. th. 10 @ 19
Planed	50 @ 6 00	75	50 @ 1 00	37 @ 45
Sandstone,				
Longmeadow	@ 80	80 @ 90		1 05 @ 1 15
Kibbe	@ 90	90 @ 1 10		
Brown (Connecticut)	1 00 @	1 25 @ 1 45	1 50 ℙ cub. ft.	1 05 @ 1 35
Amherst, Berea, Berlin, Ohio	90 @ 95 75 @ 1 00 75 @ 1 00	85 @ 95 80 @ 90 80 @ 90	55 @ 65 45 @ 55 55 @ 65	80 @ 1 00
Belleville	80 @ 1 25	1 25 @ 1 35	"	1 10 @ 1 40
New Brunswick and Nova Scotia	@ 1 00	75 @ 90	"	1 00 @ 1 10
Caen	@	@ 2 00	"	1 15 @ 1 50
Marble (ℙ *cu. ft.*)				
Lee, Mass.	@	1 75 @ 2 50	*Not sold.*	2 00 @ 2 50
Rutland, white	@	@ 3 00	3 50 @ 5 00	2 25 @ 2 50
Sutherland Falls	1 25 @ 1 75	@ 2 00	3 50 @ 5 00	1 70 @ 3 00
Glens Falls, black	@	2 00 @ 3 00	*Not sold.*	4 00 @ 4 50
Italian, blue-veined	@	50 @ 60	@ 4 40	2 50 @ 2 75
" Sienna	@	3 00 @ 3 50	*Not sold.*	@ 5 00
Tennessee, red	@	1 25 @ 2 50	@ 4 40	4 00 @ 6 00
" Knoxville	@	85 @ 90	@ 4 40	3 00 @ 4 00
Pennsylvania, blue	@		*Not sold.*	2,00 @ 3 00
Vermont, white	@	1 50 @ 2 00	3 50 @ 5 00	2 25 @ 3 00
Slate: Roofing (ℙ *square*)	7 00 @ 8 00	4 50 @ 7 00	6 25 @ 8 10	5 00 @ 7 00
" " green	@ 5 75	@ 5 75		5 40 @ 7 00
" " unfading	7 00 @ 8 50	5 50 @ 6 50	@ 8 60	@ 11 00
" purple	@ 15 00	13 00 @ 14 00	— @ 16 00	@ 11 00
" red	— @ —	Brownville, Me.	7 20 @ 7 60	@ 3 00
" black, Lehigh	— @ —	6 50 @ 9 00	7 20 @ 8 00	@ 5 35
" " Chapmans	5 50 @ 8 00	5 50 @ 8 00	6 00 @ 8 50	@ 5 3.
" Unfading Black, Monson, Me.	@		*Not sold.*	@ 27 00
Tiles, Am. ℙ M.	@			@ 7 00
N. Peach Bottom, warranted unfading				
PAINTS. (*In oil,* ℙ *lb.*)				
White lead, Am.	7 @ 7½	7 @ 7½	7 @ 7½	@ 7
" Zinc, "	5 @ 8½	@ 8	7 @ 10½	@ 7½
Red lead, Am.,	6 @ 6½	6 @ 6½	6½ @ 7	@ 7
" Venetian	6 @ 10½	7 @ 12	1½ @ 2½	dry Eng. @ 1½
" Vermilion	65 @ 70	55 @ 60 dry	55 @ 60	Eng. 18
Red Indian, Eng.	12 @ 20	12 @ 20	12 @ 20	dry Am. @ 9
Yellow Ochre	6 @ 15	7 @ 12	3 @ 15	@ 1½
" Chrome	12 @ 20	18 @ 25	15 @ 25	@ 20
Green (chrome)	8 @ 13	8 @ 20	10 @ 20	@ 20
Green, Paris,	25 @ 40	25 @ 40	18 @ 35	" @ 20
Black, lamp,	15 @ 25	15 @ 25	8 @ 30	@ 16
Blue, ultramarine	12 @ 18	18 @ 30	12 @ 35	@ 20
Oil, linseed, (raw) (ℙ gal.)	43 @ 44	41 @ 43	42 @ 43	@ 45
" " boiled	45 @ 46	44 @ 46	45 @ 46	@ 48
Turpentine	40 @ 41	45 @ 48	@ 46	@ 40
Varnish, coach	@	1 50 @ 6 00	1 25 @ 2 00	@2 25
Shellac	@	2 50 @ 3 00	3 25 @ 4 00	@2 90
Putty (dry)	2 @ 3	2 @ 4	02 @ 02½	@ 2
Whiting	50 @ 65	1 @ 1½	1 @ 2	@ 1
Paris white, (Eng.,)	2 @ 3	2 @ 3	2 @ 2½	@ 1½
Litharge, Am.	5½ @ 5½	6½ @ 7	6½ @ 6½	@ 7
Sienna (burnt)	12 @ 17½	14 @ 20	4 @ 16	@ 16
Umber, "	11 @ 16½	14 @ 20	2 @ 10	@ 14
HARDWARE.				
Nails: (*Per Cask.*)				
Spikes, (*wrought.*)	@ 2 50		3 50 @	per keg @ 2 90
10d. common	@ 2 35	@ 2 40	@ 2 40	@ 2 67
Shingle	@ 3 00	@ 3 15	@ 3 15	@ 3 15
Lath	@ 4 55	@ 4 65	@ 5 50	@ 5 27
(*Finishing nails according to size.*)			Add $3.00	per lb 11 @ 14
(*For casing nails add 75c. per keg.*)				Add 1 00 pr cask
Butts: 4" x 4" (ℙ doz. pairs.)				
Plain	@ 1 00	@ 1 20	65 @ 1 00	@ 1 16
Japanned	@ 1 50	@ 1 75	*Not sold.*	1 75 @ 2 00
Acorn, Japanned	@ 1 50	@ 2 50	2 00 @ 3 75	1 75 @ 2 00
Acorn, Boston finish (ℙ pair.)	@ 65	@ 75	*Not sold.*	@ 50
Bronze metal	@ 1 00	plain 2 25	2 00 @ 3 25	@ 1 37
Brass (for cupboards)	@ 10	@ 10	@ 12	@ 1 00
Ebony				@ 37
Apple wood				37 @ 1 00
Knobs: (ℙ *Set.*)				
Mineral, best	@ 8	@ 10	8 @ 10	@ 08
Lava	@ 50	@ 75	65 @ 80	*Not sold.*
Hematite	*Not sold*	17 @ 38	31 @ 40	25 @ 50
Porcelain	@ 30	@ 12	25 @ 30	@ 3
Glass, solid	*Not sold*	@ 75	*Not sold.*	1 75 @ 2 00
Glass, silvered	*Not sold*	88 @ 1 50	@ 1 50	1 75 @ 2 00
Bronze metal	75 @ 2 00	88 @ 2 00	75 @ 2 50	50 @ 3 50
Brass	1 00 @ 2 50	88 @ 2 00	1 50 @ 3 00	50 @ 3 50
Solder:		16 00 @ 17 00	13 00 @ 15 %	22 @ 35
Iron:				
I-Beams up to 12"	@ 3	@ 3	@ 4	30 2½ @2½
I-Beams above 12"	@ 3	@ 3	@ 4	
Channel-Beams up to 12"	@ 3	@ 3	@ 4	

(*Continued on page* vii.)

METALLIC ART TILE

6 x 6 (Patented)

For Dados, Wainscots and Decoration.

Special Designs and Sizes on Estimates.

UNION BRASS MANUF'G CO.,

CHICAGO, ILL.

Charles Howson. Henry Howson Hubert Howson.

Established 1853.

HOWSON & SONS,

Patent Soliciting,

— AND —

PATENT LAW.

Principal Offices, 119 South Fourth St.,

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Heating Apparatus.

New Edition of 96 pages, with additional matter, and illustrations of 45 of the finest residences in the country. A complete Manual on the subject of Sanitary Heating and Ventilating, besides giving valuable suggestions to those who are building or furnishing a home. The book is exceedingly artistic, and will be mailed free on receipt of 6 cents in stamps

SMITH & ANTHONY STOVE CO., Boston, Mas

BISSELL & CO.,

PITTSBURGH, PA.

Plain and Artistic Grates.

PEERLESS

Shaking and Dumping Grates a *Specialty.* All shapes of Frames. Electro-Bronze, Brass and Black. *Send for Catalogue and other information.*

In writing, please mention this Paper.

W. H. HARRISON & BRO.,

Manufacturers.

PLAIN AND ARTISTIC

GRATES

AND FIREPLACES

A SPECIALTY.

Also. **Furnaces and Ranges.**

Send for Illustrated Catalogue. 1435 Chestnut St., Philadelphia.

MANUFACTURER OF

SLATE MANTELS,

Heaters, Grates and Ranges.

MATTHEW HALL,

1927 & 1929 Market Street,

PHILADELPHIA, PA.

Heating Apparatus.

The GOODWIN GAS STOVE & METER CO.,
MANUFACTURERS OF
The Sun Dial Gas Cooking and Heating Stoves.

The most economical in use. Over 100 different kinds. Suitable for Families, Hotels, Restaurants and Public Institutions. Laundry, Hatters' and Tailors' Heaters. Hot-Plates, Warming-Closets for Pantries. Hot-Water Generators, etc., etc.

1012-1018 Filbert Street, Philadelphia.
4 W. 14th St., New York.
76 Dearborn Street, Chicago.
Waldo Bros., Agts., 88 Water St., Boston, Mass.

THE H. B. SMITH CO.,
MANUFACTURERS OF
The Union Steam and Water
HEATING APPARATUS,
For Public Buildings and Private Residences.
Also Manufacturers of
Reed's Improved Cast-Iron Radiators,
Mill's Safety Sectional Boilers,
Gold's Indirect Pin Radiators, etc.
Office and Warerooms, 137 Centre St., New York.
Foundry, Westfield, Mass.

DUPLEX STEAM HEATER CO.,
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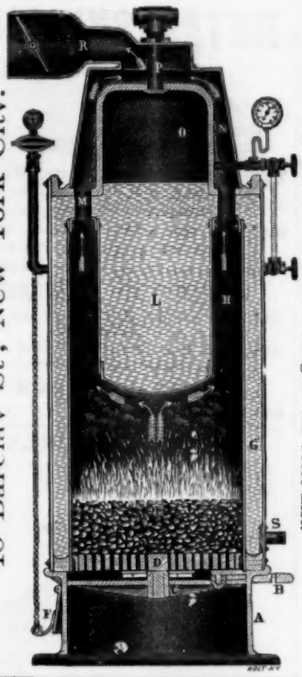
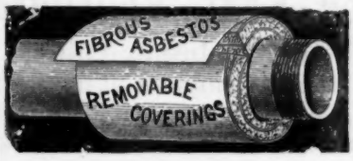


Steam Heaters for Public Buildings, Private Dwellings, Schools, etc.
Send for Illustrated Catalogue and Price-List.



PIPE-COVERING.
This covering is made entirely of Asbestos, and can not be affected injuriously by heat or dampness, nor can it be made a harbor for vermin.
Asbestos Building-Felt, Fire-Proof Cements, etc.
THE CHALMERS-SPENCE CO.,
419-421 E. 8th Street, - - NEW YORK.

STEAM WARMING.
BATES & JOHNSON,
114 LEONARD STREET, - - - - - - NEW YORK.
59 West Water Street, Syracuse. 310 Broadway, Albany.
House Warming a Specialty. Estimates Furnished on Application.

SHIELDS & BROWN,
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MANUFACTURERS AND SOLE PROPRIETORS OF
BRADLEY'S

FOR BOILERS AND STEAM PIPES.
Reduces Condensation of Steam.
FOR GAS AND WATER PIPES.
Prevents Sweating and Freezing.
The best Non-Conductor of Heat and Cold in the World.
Send for illustrated descriptive Circular, and name this paper.
132 Cedar Street, New York.

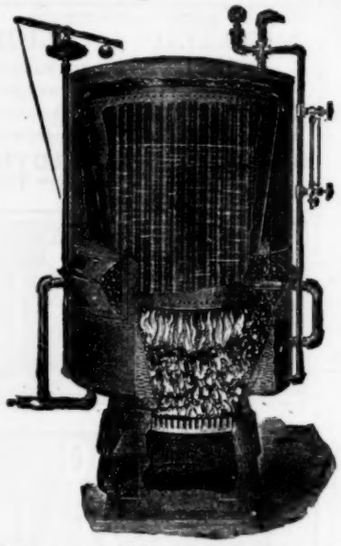
SLATE MANTELS
Of the latest and most beautiful designs, and all other Slate and Soapstone work on hand or made to order, JOSEPH S. MILLER & BROTHER, 1210 Ridge Avenue, Philadelphia, Pa. Successor to Wilson & Miller.
Send for Illustrated Price-List.

THE FLORIDA
House - Heating Boiler.
(Catchpole's Improved.)
The cheapest and most economical Low-pressure Steam Boiler in use. Illustrated Catalogue free.
The FLORIDA BOILER WORKS, Geneva, N. Y.

REGISTERS MADE TO ORDER FROM THE SPECIAL DESIGNS OF ARCHITECTS.
Manufacturers of Warm-Air Registers, Ventilators, Ornamental Screens, Etc.
The Tuttle & Bailey Mfg. Co.,
64 UNION STREET, Boston, Mass.
83 BEEKMAN STREET, New York.

MASON REGULATOR CO., 115 Liberty Street, New York.

GORTON'S Latest Improved
House-Heating Steam-Generator,



Automatic, Self-Feeding, Wrought-Iron Tubular and Sectional.
ECONOMICAL IN THE USE OF FUEL.
The coal reservoir (see cut) surrounds the lower outer surface of the boiler, and will hold enough coal to keep up a steady fire and steam for from twelve to twenty-four hours without re-filling.
The coal will steadily feed down from the outer surface and distribute itself at a very uniform depth over the surface of the grate, as it is needed.
It is also very easy to get at the fire and to clean the grate without dumping it.
No brick or mason work required in setting.
Send for illustrated catalogue giving full description and prices.
GORTON BOILER MFG. CO., 110 Centre St., New York.

BUILDING MATERIALS.

	New York. (Wholesale Prices.)	Boston. (Prices to Builders and Contractors.)	Chicago.	Philadelphia.
LUMBER.—₱ M.				
Boards: (*Ordinary dimensions.*)				
Pine, 1st quality, clear	65 00 @ 75 00	50 00 @ 60 00	46 00 @ 48 00	55 00 @ 60 00
" 2d quality	55 00 @ 60 00	42 00 @ 48 00	44 00 @ 46 00	40 00 @ 50 50
" 3d quality	18 00 @ 22 00	35 00 @ 40 00	43 00 @ 45 00	15 00 @ 30 00
Spruce	@ 25 00	13 90 @ 15 00	*Not sold.*	@ 35 00
Hemlock	ea. 17 @ 18	12 00 @ 13 00	@ 10 00	@ 14 00
Yellow pine	20 @ 40	25 00 @ 40 00	@ 28 00	20 00 @ 50 00
Cypress	@	32 00 @ 40 00	@	40 00 @ 45 00
Clapboards:				
Pine	@	33 00 @ 55 00	10 50 @ 22 00	20 00 @ 35 00
Spruce	@	23 00 @ 35 00	*Not sold.*	*Not Sold.*
Framing Timber:				
Pine			12 00 @ 17 00	28 00 @ 32 50
Spruce	13 50 @ 16 00	13 50 @ 16 00	*Not sold.*	20 00 @ 22 50
Hemlock	12 00 @ 15 00	@	10 50 @ 15 50	12 50 @ 13 50
Yellow pine	18 00 @ 25 00	23 00 @ 30 00		26 00 @ 28 00
Laths:				
Pine	@	2 25 @ 2 35	1 75 @	@ 3 00
Spruce	2 00 @ 2 25	2 25 @ 2 50	*Not sold.*	@ 2 75
Shingles:				
Pine, shaved ₱ M	5 00 @ 6 00	@	*Not sold.*	
Pine, sawed "	4 00 @ 5 50	@ 4 50	2 40 @ 2 60	
Spruce, sawed "	1 50 @ 2 00	1 50 @ 2 00	*Not sold.*	
Redwood ₱ 125	1 40 @ 1 60	3 75 @ 4 50	5 50 @ 8 00	{30" $10 @ 28
Cedar, split ₱ M	@	@	*Not sold.*	{24" 8 @ 21
Cedar, sawed "	@	2 00 @ 4 00	2 25 @ 2 35	{20" 5 50 @ 14
Cypress. Split....7 x 24. "	18 00 @ 20 00	5 50 @ 6 00	4 00 @ 4 50	13 00 @ 20 00
Miscellaneous:				
Piles ₱ ft.	4½ @ 5½	Piles 6c. ₱ ft.	*Not sold.*	
Fence pickets, Spruce	8 00 @ 10 00	10 00 @ 18 00	Pine, 8 @ 21 00	12 00 @ 14 00
Cedar posts, 9 ft. (sq. posts.)	@	25 @ 35	9 00 @ 21 00	70 @ 1 25
Chestnut "	@	25 @ 35	*Not sold.*	28 @ 36
Finishing Woods: ₱ M. (*First Qual.* [*Kiln-dried.*)				
Ash	@ 55 00	38 00 @ 50 00	35 00 @ 40 00	35 00 @ 50 00
Cherry	80 00 @ 120 00	60 00 @ 100 00	80 00 @ 100 00	75 00 @ 120 00
Chestnut	@ 55 00	38 00 @ 50 00	45 00 @ 50 00	40 00 @ 50 00
Butternut	40 00 @ 60 00	60 00 @ 70 00	50 00 @ 60 00	67 50 @ 75 00
Mahogany, Baywood [Mexican]	@ 180 00	150 00 @ 160 00	150 00 @ 180 00	150 00 @ 250 00
" St. Domingo	@ 350 00	120 00 @ 350 00	250 00 @ 300 00	200 00 @ 300 00
Maple	45 00 @ 50 00	45 00 @ 60 00	30 00 @ 35 00	27 50 @ 55 00
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" white	@ 70 00	50 00 @ 55 00	35 00 @ 40 00	40 50 @ 50 00
" quartered	@ 90 00	65 00 @ 70 00	45 00 @ 50 00	57 50 @ 67 50
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Pine, clear	65 00 @ 70 00	3 00 @ 65 00	45 00 @ 50 00	@ 65 00
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Rosewood ₱ lb	@ 6		@ 7	
Walnut, black	125 00 @ 150 00	85 00 @ 120 00	80 00 @ 100 00	90 00 @ 200 00
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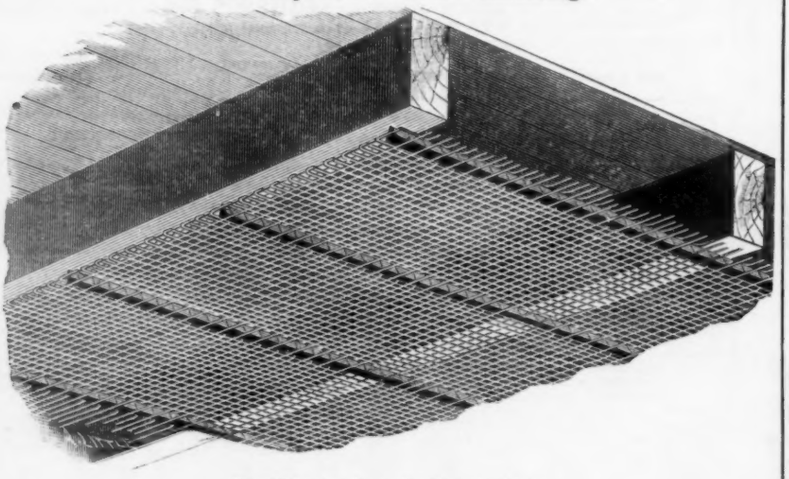

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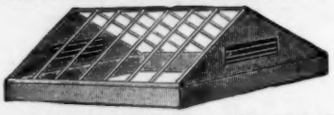

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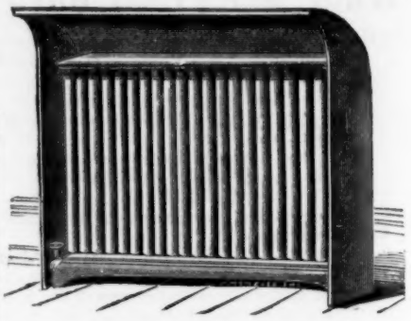

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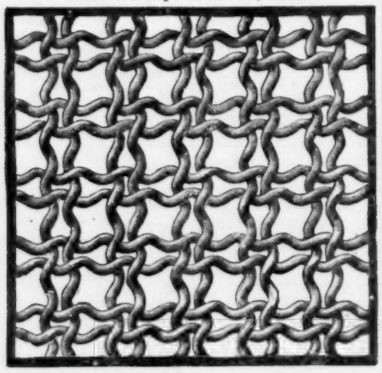

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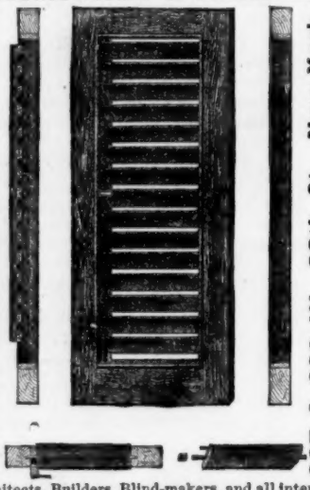

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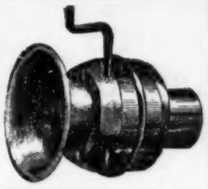

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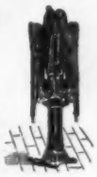

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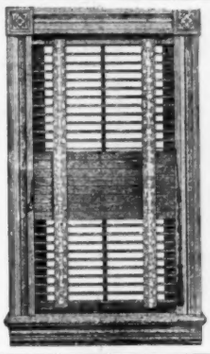

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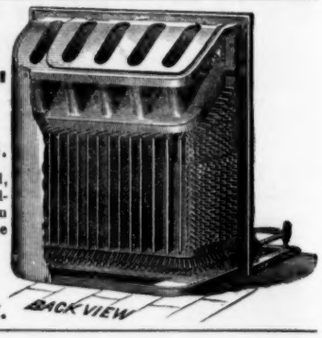

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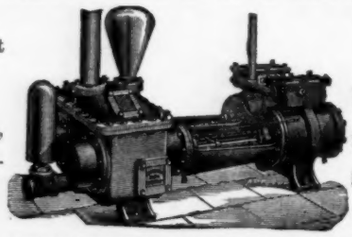

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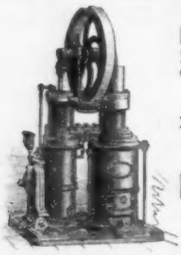

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WE learn with deep regret of the death of the most noted of American architects, Mr. Henry H. Richardson, who expired last Tuesday night at his home in Brookline, after a brief illness. Mr. Richardson was born in Louisiana in 1838 or 1839, and was therefore in the very prime of his artistic powers at the time of his decease. His short life had been in some respects an eventful one. Brought up as the petted son of a rich and distinguished Southern family, his natural capacity and ambition soon began to show themselves, and he was sent North, after his early education was completed, passing four years in college at Cambridge. Graduating at Harvard in 1859, if we recollect rightly, his artistic instinct led him to interest himself in the study of architecture, and immediately after leaving college he sailed for Europe, and entered the École des Beaux-Arts in Paris. At that time American students were rare in Paris. Mr. R. M. Hunt had pursued the course in architecture with distinction, and had done some professional work in Paris, but had at this time, we believe, returned to America, so that Mr. Richardson found himself alone. His ability and enthusiasm however, soon made him friends among the other students, and for seven years he lived on terms of the closest intimacy with the best men in the school. He retained, of course, his pleasant relations with his American friends who visited Paris, and was happy in being able to be of service to another American student, Mr. Lindsey of New York, who entered the school some years later, but in all other respects he was a Frenchman with his companions, sharing their ambitions and helping them in their work, and taking part in the interchange of ideas which young French artists enjoy so much. In one respect, however, he kept consistently in view his future career in his native land. Although he was soon distinguished for his cleverness, and won numerous honorable mentions in the regular *concours*, he refused to compete for any of the school medals and prizes which were open to him, preferring to exercise himself in as great a variety of work as possible, rather than devote months to the study of the single subjects assigned in the contests for prizes.

ENTERING the school as a rich young amateur, the work of his earlier years, although full of energy and enthusiasm, was naturally somewhat interrupted by the requirements of society, as well as by the details of the collection of a professional library, which he had begun, and was adding to with the discreet liberality of a connoisseur with ample resources. In the second year of his residence in Paris, however, the American civil war broke out, and his communication with his family in Louisana was soon broken off, not, however, before he had learned that the fortune of war had reduced his parents to poverty, and that he must thenceforth depend upon his own resources. This misfortune, sudden and terrible as it seemed, proved in the end the making of a great architect, as well as of a man of uncommon force of character. He found himself in a foreign city, surrounded by luxuries, but with only a few francs of ready money, and no prospect of getting any more except by his own exertions. His courage, however, soon rose to the emergency, and he prepared for the battle of life with a resolution which few men, thrown penniless upon the world, would have shown. Such books and pieces of furniture as had not been already paid for were sent back to those who sold them, and the sacrifice of a large portion of the others supplied him with the means of supporting himself for a few weeks while he looked for employment. Naturally enough, he applied first to his instructors in the school, and was rewarded for his unselfish industry during his years of opulence by the offer, made through his *patron*, M. André, who still lives to mourn his loss, of a modest position in the office of one of the Government architects, where he toiled through the long hours of a French draughtsman's day, beginning again at night with his work on his problems for the school, with which he still maintained a close connection. In this way, poor, but happy in his work, and in the affection and applause of his fellow students, the young American completed his seven years of school life. His position in the Government office had by this time improved, and he had secured what the French consider a good opening in life, but, notwithstanding the entreaties of his companions, he resolved to give up his prospects in Paris, and try his fortune once more in the country to which his deepest sympathies drew him. Returning to New York, he established himself in business, and by the slow steps which every young architect knows, he built up a reputation which has until now never ceased to brighten and increase. His first commission of importance was the Boston & Albany Railroad office-building at Springfield, a beautiful structure, of Italian Renaissance style, and he built soon afterward two churches in the same place, the North Church and the Church of the Unity. These had hardly been completed when he was invited to compete for the Brattle-Street Church, on the corner of Commonwealth Avenue and Clarendon Street in Boston, and his design for this gave him the first opportunity which he had ventured to use for the introduction of those original and striking motives which occurred to him so readily. Most of our readers know this church, which is in the Romanesque style which Mr. Richardson afterwards employed so nobly, and is adorned by a tower bearing a frieze sculptured with colossal figures. The novelty of the design pleased the judges, and it was adopted, and Mr. Richardson then, for the first time, felt his future secure enough to marry the young lady who had waited faithfully for him since he left this country for Paris.

WE need not detail the succession of brilliant works which followed the Brattle-Street Church. No doubt the best-known of Mr. Richardson's buildings is Trinity Church, in Boston, where a great opportunity was magnificently used. The reputation of this building brought him so many commissions in Boston, that before its completion he removed his family to Brookline, a suburb of Boston, where he has since lived, surrounded by the friends of his youth, for whom he cherished an unchanging attachment. Toward strangers, although he was uniformly kind and courteous to the hundreds of acquaintances which he made in his business, he felt no great attraction. So long as he could work at his beloved profession, with his family around him, he cared for nothing more. Partly, perhaps, through the influence of his long residence among the French students, and partly, also, through the effect of the dangerous and often distressing infirmity which harassed him for nearly thirty years, and interfered in many ways with his activity, Mr. Richardson's natural eagerness and enthusiasm had, during the years of his professional life, become concentrated into a passionate love of architectural art, which left little room in his thoughts for anything else besides his wife and children, to whom he was always tenderly devoted. It was this intense enthusiasm, more, perhaps, than anything else, which made Mr. Richardson's office so good a school for young men. To him his work was everything. He could talk well of a hundred other things, and did so when the occasion seemed to require it, but he had evidently not much heart in them, and was always glad to return to the one theme of which he was never tired, and from which no pain or fatigue could turn away his thoughts. It was impossible to be long near him without sharing to some extent in his enthusiasm, and the high ideal of

their work which so honorably distinguishes the younger generation of our architects is undoubtedly due in great part to the direct or indirect influence of his example. In his death American architecture suffers an incalculable bereavement. Few of us, perhaps, and least of all himself, have realized how conspicuous he was in the profession in this country, yet from Maine to Texas there is probably not an office in which Mr. Richardson's work, past and to come, was not an inexhaustible subject of discussion and source of inspiration. It will be harder than we think to accustom ourselves to go without this, but if we would do as he would wish to have us, let us, as the recollection of our loss recurs to us, resolve to emulate his courage and enthusiasm, and rejoice that his physical sufferings should to the end have been consoled by the affection which he cared for beyond all other things.

THE competition for the Rotch Scholarship in Massachusetts, held last month for the third time, has resulted in the selection of Mr. George B. Newton, of Brookline, as the beneficiary of the fund for the next two years. Mr. Blackall, the first holder of the scholarship, will return this summer, after two years of well-directed study. Mr. Mead, the scholar of last year, has still another year to enjoy the opportunity which the generosity of the Rotch heirs affords him; and Mr. Newton will find his way made easier for him, not only by the experience of the gentlemen who have preceded him, but by the favorable impression which their industry and intelligence has already made upon the persons on the other side of the ocean who are best able to assist such students in their work. Although the competition for the scholarship this year was confined to a small number of contestants, only three, we believe, having reached the final examination, the character of these seems to have been unusually high, and Mr. Newton has won his laurels from rivals well worthy of his steel. As usual, the examinations were conducted with scrupulous care, Professor Ware and Mr. J. Cleaveland Cady having been invited from New York to act, with Mr. W. P. P. Longfellow, of Boston, as judges of the competitive designs.

WE hardly know whether the profession of architecture or the tribe of the Philistines will feel the more highly honored at the selection by the Queen's Most Excellent Majesty of Sir Edmund Beckett, otherwise known as Mr. E. B. Denison, for elevation to the peerage of England. On the whole, the compliment seems to have been intended more particularly for the architects, the new peer being, according to his own account, a person of distinguished skill in their art, and we take pleasure in congratulating our British cousins upon the indication which the selection affords that the Upper House, instead of being recruited from the ranks of the beer-sellers and money-lenders, may hereafter occasionally, as was once usually the case, receive new members from among those professions in which the possession of a soul is considered necessary to success. We should have liked much to witness the solemnity of his lordship's installation. Perhaps the details of the ceremony have been changed of late years, and indeed, we suppose that the vow of courtesy to all men, which the candidate could hardly have taken without fatal results, must have been dispensed with on this occasion, but the spectacle of the proprietor of St. Albans keeping in white robes his vigil in the sanctuary must have been an edifying one. In his new sphere of usefulness we predict with sincere confidence a brilliant career for his lordship. Whatever may be his faults of training or temper, Sir Edmund Beckett is a very able man, and if he will turn that "eye for defects," which he considers the most valuable possession of one who has to supervise the construction of buildings, and which his remarks about other people show that he has cultivated to the utmost, to the contemplation of the British Constitution and the condition of his fellow-subjects, we may be sure that he will find some way to help in the amelioration of both.

THE fourteenth annual meeting of the American Public Health Association is to be held in Toronto, Canada, commencing on the fifth of next October, and continuing four days. The subjects discussed will be the Disposal of City Refuse, Water-Supply, the Teaching of Hygiene in Public Schools, the Suppression of Epidemics, the Sanitary Conditions and Necessities of School-houses and School Life, and the Preventable Causes of Disease, Injury and Death in American Manufactories and Workshops, and the Best Means and Appliances for Preventing and Avoiding them. Through the generosity of Mr. Henry Lomb, of Rochester, N. Y., the Association is enabled to offer prizes for essays on the last two subjects, as well as for plans for small dwelling-houses, which are also to form the theme of an important discussion. As most architects are more or less familiar with these subjects, the details of the competition will be found interesting. The whole fund which Mr. Lomb proposes to devote to the prizes amounts to seventeen hundred and fifty dollars, of which five hundred will be given for the best essay on the Sanitary Conditions and Necessities of School-houses and School Life, and five hundred for the best essay on the Preventable Causes of Disease, Injury and Death in American Manufactories and Workshops, and the Best Means and Appliances for Preventing and Avoiding them. The rest of the fund is divided into eight prizes of varying amount, two hundred dollars being offered for the best plan for a dwelling-house to cost, exclusive of cellar, not more than eight hundred dollars; while a second prize of one hundred dollars, a third of fifty, and a fourth prize of twenty-five dollars, will be given for the plans succeeding in order of merit. The other competition is for plans of a dwelling-house to cost not more than sixteen hundred dollars, including the cellar; and four prizes are offered of the same value as those for the plans of the cheaper house. Each house must provide accommodation for a family of five persons. The Committee of Award for the dwelling-house plans includes Dr. John S. Billings, Colonel George E. Waring, Jr., Dr. E. M. Hunt, Secretary of the New Jersey State Board of Health, Dr. J. H. Raymond of Brooklyn, N. Y., and Professor Charles N. Hewitt, Secretary of the Minnesota State Board of Health. The Committee of Award for the essay on the Sanitary Conditions of School-houses consists of Dr. E. M. Moore, President of the New York State Board of Health; Dr. Albert L. Gihon, Medical Director, United States Navy; Dr. Charles Smart, Surgeon in the United States Army; Professor C. A. Lindsley, Secretary of the Connecticut State Board of Health; and Dr. J. T. Reeve, Secretary of the Wisconsin State Board of Health. The Committee of Award for the essay on the Preventable Causes of Disease in American Manufactories consists of Dr. Granville P. Conn, President of the New Hampshire State Board of Health; Dr. Fallon, of the Massachusetts Board of Health, Lunacy and Charity; Dr. Stephen Smith, of New York; Mr. Crosby Gray, of Pittsburgh; and Dr. C. W. Chancellor, Secretary of the State Board of Health of Maryland. No stipulation is published as to the essays or the plans except that all intended for competition must be in the hands of the Secretary of the Association, Dr. Irving A. Watson, Concord, N. H., on or before August 15 next. Each essay or plan must have a motto, and must be accompanied by a sealed envelope containing the author's name and address, with his motto on the outside of the envelope. The awards will be announced at the meeting of the Association, in October.

A NOVEL system of transmission of force has been successfully put in operation in Paris, and seems likely to prove of considerable value in helping to solve the problem of the introduction of labor-saving machinery in small workshops. The agent employed in the new motor is air, but instead of being transmitted under compression, the machines at the central station pump out the air from the pipes which radiate to the various motors, and movement is obtained in these by opening a valve and admitting a portion of the surrounding atmosphere to supply the vacuum in the pipes. Although there does not seem, at first sight, to be much difference between this way of moving a machine and the old method of forcing air into the pipes and letting it escape through the motors, the system of exhaustion is found to have some practical advantages. In pipes used for conveying compressed air there is usually a certain amount of condensation of water from the vapor dissolved in the air, and it is necessary to carry this off by traps like those used for separating condensed water from steam; while the expansion of the compressed air in the motor is accompanied with an abstraction of heat from the surrounding matter, which sometimes freezes any condensed water which may have accumulated there, and is apt to give trouble by thickening the oil used for lubrication. None of these inconveniences are met with in the system by exhaustion, and the force provided is much more easily regulated than that of compressed air, the variations in which must be moderated by regulators before it can be made available for driving delicate machinery.

THE WORKINGMEN'S COLONY AT ESSEN, GERMANY.[1]

Shaft of Column in the "Grand foyer" of the Grand Opera House, Paris.

AT the beginning of the present century Essen was a mere country village, too small to be noticed by any traveller, serving only as a centre for the agricultural inhabitants of the district to the northwest of Dusseldorf. The population amounted to about three thousand. At that time the immense coal deposits which underlie that whole section of the country were little appreciated, and but feebly worked in a few places. There were no industries of any description. In 1810, however, the Krupp Steel Works were organized, though on so small a scale and with so limited a practice that as late as 1848 the number of workmen amounted only to seventy-two. About this time the business passed into the hands of the second Friedrich Krupp, the present owner, and the establishment began the manufacture of cannon, which has since given it such a world-wide fame. The European wars of 1848 and 1856, our own war of the Rebellion, and especially the Franco-Prussian war were all so profitable to the Krupp works that by 1875 the number of hands employed had risen to 11,543. Indeed, looking over the record of the business transacted by the establishment during the past fifty years, one can easily see at what times the nations of Europe were at war with each other, for the immense extension given to the works in later years, and the extraordinary ability developed for turning out weapons of offensive warfare, combined with the untiring activity displayed in devising heavier cannon or more effective armaments, have made Herr Krupp a power in Europe with which nearly all the Governments have to do in case of war. The Krupp guns are found not only all over Europe, but also in China, Japan, the South American republics; in fact, in every country except those in which the English language is spoken. Great Britain and America do their own gun founding.

Herr Krupp has now in his employ, as actually listed on his books, very nearly 22,000 men, of which number 17,000 are daily employed in the central factory at Essen, while the rest are distributed in the various coal and iron mines in Germany and Spain, which are worked for the exclusive supply of the central establishment. It is easy to write 17,000, but it is hard to think of that number of men being under the direct employ of one person, and more difficult still to think of 22,000 men, with women and children representing a total population of not less than 75,000 souls, who look to the employment offered by the Krupp Steel Works for their daily bread. And even after one has had the rare privilege of visiting the works, and has seen the mighty engines in motion, the huge, roaring retorts vomiting steel all day long, the fifty-ton hammer condensing the steel blocks into gun-barrels, and the rolling-mills turning out steel rails by the mile; and has climbed into the muzzle of one of the 200-ton guns, and been told how many miles of telegraph-wire and railroad-track, how many locomotives and how many freight-cars, and — well, how many men are made use of within the carefully guarded enclosure of the vast establishment, the mind still fails to grasp the extent of it all, and one goes away wondering what would happen to these 75,000 souls and this expensive machinery if the works should be mismanaged or stop operations only for a few days.

The housing of so many workmen is quite a question. The city of Essen itself could not adequately provide for them, as the supply of dwellings did not keep pace with the growth of the number of inhabitants, the workingmen being crowded into uncomfortable tenements for which they were obliged to pay prices out of proportion to the accommodation afforded. Thus, while in 1820 the number of persons to each tenement in the city was only 6.39, in 1864 the average had risen to 15.30, or the equivalent of at least three families living in quarters intended for but one. It became, then, a necessity for Herr Krupp to provide for the growth he himself had brought to the city; and in 1860 the work was begun by the erection of two blocks of houses for the use of the office clerks and superintendents. During succeeding years other houses were built for the workmen as fast as the demand seemed to warrant their construction, until, in 1881, 18,698 souls were lodged in the houses erected by Herr Krupp, the total number at that time dependent upon the works for support being 65,381. Official reports since that date are not to be had, but as nearly as could be ascertained, there are now in all 3,170 tenements occupied by employés of the works.

[1] It may be of interest to state that this article, judging from the time it reached us and its moist and blurred condition, probably just escaped the fate that attended so large a part of the unfortunate "*Oregon's*" mails. By a happy conjuncture the illustration, which, if it had been sent by the same mail, would probably have been sent with the newspaper mail in another bag and so, probably, lost, was not quite finished, and was sent to us safely by a later steamship.

The houses are arranged in colonies grouped as near the entrance to the works as circumstances would permit. The largest of the colonies has 1,248 tenements; the rest are much smaller, there being seven in all. These colonies belong wholly and entirely to Herr Krupp — land, streets, houses, gas and water supplies, stores, all are in his name, and he even provides police and fire departments, the city having no rights over the districts any further than that they form a part of the commune and are taxed accordingly. In this way Herr Krupp has entire control over his workingmen's houses, and can manage them as he sees fit.

The large number of workmen to be accommodated, and the high cost of land, as well as a desire not to have the colonies extend too far away from the works, decided Herr Krupp not to adopt the cottage system for his houses. Consequently all the colonies are built up in blocks of from three to ten houses, mostly three stories high. The construction is essentially the same throughout. The walls are of common brick. Under each house is a clean, dry cellar, 2 m. 10 high, used only for storage of fuel, each tenement being allotted its share of space. The floors are of wood, the interior walls are plastered and painted in oil colors, the stairs are of stone, the roofs are covered with tiles. There are no open fireplaces, but in general each tenement has two rooms which are provided with a flue. There is one water-closet for every two flats. The first and second stories are from 2 m. 94 to 3 m. 18 high in the clear, and the third story 2 m. 55 to 3 metres. Some of the earlier houses were made with lower stories, but the larger dimensions seem to be preferred. The houses are mostly arranged with tenements of two and three rooms each, all the rooms being of about the same size, and averaging approximately 165 square feet in area. Comparatively very few houses are arranged with four and five rooms to the tenement, none of these being in very great demand.

Water-mains are laid in all of the streets, with hydrants at each corner from which the tenants of the houses draw as needed for their use, there being no supply of water to the houses. The streets and all hallways, as well as a few of the larger tenements, are lighted with gas. None of the colonies are provided with sewers, all of the waste being collected in tight cesspools, which are emptied at stated intervals. The entire water, gas and sewage removal plant has been installed by and remains in the possession of Herr Krupp.

No one type has been followed in planning the houses, nor does any plan appear to have been evolved which has been adopted as perfect in all its details; but the one which is repeated the most often is that used in the Kronenberg colony, Fig. 2. [*See Illustrations.*] In this, each family has but two rooms. The water-closets are on each side of the front door, an unpleasant feature which is repeated in nearly every colony. Another scheme used in the same district is shown by Figure 2, each flat in this case having three rooms, the entrance being at the side, and there being but two houses in a block; a much better arrangement in some respects, though not as much sought after, the workmen generally preferring to crowd themselves and families into two rooms rather than pay extra for more accommodation. The Kronenberg colony is not only the largest but also the most pleasantly situated and of the most recent construction. The blocks of houses are built far enough apart to allow space for each family to have a little plot of ground which may be cultivated as desired, besides which each house has allotted to it a grass-plot about thirty feet square, which the individual families utilize successively for drying clothes. In the centre of the colony is an extensive market place where, under certain restrictions, the country people can sell their produce to the workmen, and where village fairs are held from time to time. As to the houses themselves, they are well built and kept in good order and answer every purpose of housing the people, but they are far from pleasant in appearance. They are plain, inexpensive barracks — hardly more; and no one could possibly conjure a home out of the forlorn, dull red structures which repeat themselves block after block with such monotonous sameness. It is a hard task, perhaps, to suit 75,000 working people, and the laborers are undoubtedly much better housed than they could possibly be if Herr Krupp had not undertaken the work; but it costs so little more to make the houses attractive that one cannot help wishing for a little less comfort, perhaps, and more individuality.

But if the Kronenberg colony is plain and tasteless, the adjoining colony of Schederhof is a hundred-fold worse. Figures 3 and 4 give the two types of plans, which of themselves are not at all bad; indeed, Figure 3 is better than the plans previously considered in that the water-closet arrangements are more private. But gloomier, more forlorn-looking streets could hardly be imagined than are made by the rows of these houses, all in dark, smokey brick, no yards, no trees, no sidewalks even, no grass plots, nothing but these gloomy, three-story structures, reaching from street to street, and as repulsive as a prison or a tobacco factory. This colony has never been extended, fortunately, for the workmen who might have to live therein, and has never been imitated elsewhere.

For the houses themselves, the Drei Linden colony is the most pleasing. Figures 5, 6, and 7 give the three types of plan. The houses here are all two stories high, and by arrangement of wings, roofs and recessed balconies an attempt is made at a little individuality. There are but two houses in a block, and each block, or house, for each has the appearance of a single house, is set back from the street and surrounded by a garden, giving a rather pretty effect to the entire colony. Indeed, these are the only houses that have anything like a *home* look, the only ones that would not answer just as

well for stables or barracks; but for some reason the Drei Linden colony is quite small and none of its types have been used in subsequent construction elsewhere. The colony is about three-quarters of a mile from the works, and somewhat out from the city, and the land being cheaper it was not essential that the tenants should be concentrated into three-story houses.

Figure 8 shows the plan adopted for the houses intended for the use of the clerks and superintendents, there being four and six houses in a block, of three stories in height. The plan shows an upper story. The entrance is in the front under the room marked A, this room being connected with the tenements on either side of the hall, and rented with one or the other as desired, thus allowing for suits of four and five rooms each. The water-closets open from off the stair-landing.

Besides the houses divided into tenements Herr Krupp has erected five large buildings which are designated by the doleful name of the Bachelors' Barracks, where single rooms are rented to unmarried men. There are four *Kasernen* accommodating one hundred and twelve men each, and one monster building immediately adjoining the rear entrance to the works, which can receive twelve hundred tenants. As nearly as could be ascertained all of the occupants are obliged to provide their own furniture, though the care of the rooms is in the hands of a janitor. There are also a number of houses known as *Barackenwohnung*, divided into tenements of two rooms each, but without cellar accommodation or any garden or grass-plot privileges.

The rents of the tenements vary from 60 to 1200 marks per year, being 60 to 90 marks for two rooms in a *Barackenwohnung*, 90 to 108 marks for two rooms with cellar, etc., 120 to 162 marks for three rooms and cellar, 180 marks for four rooms and 210 marks for five rooms. The average price for the workingmen's tenements is about 108 marks, or $27 per year. The rent of the houses for clerks and superintendents runs from 180 to 1200 marks per year, with an average of 250 marks, or $62.50. As previously stated, none of the houses are sold under any conditions whatever, nor are leases granted for more than a year. The rent is collected from the wages of the men every two weeks. It should be stated that the tenements are rented only to employés of the Krupp works. There are several other manufacturing establishments in Essen, but the workmen in all of them are obliged to find quarters in the city.

Herr Krupp has not stopped his work at merely providing shelter for his hands, but he likewise furnishes them at nearly cost price, every article that is required for home consumption, including furniture and cooking utensils, coal, oil, groceries, bread, meats, liquors, clothing of every description, sewing-machines, books and periodicals, and even articles of luxury and personal adornment. At a central point is established a large magazine where all articles are kept in bulk as well as sold over the counter. The quality of the goods is the best the market affords; indeed, as these stores sell to outsiders as well as to those who are employed in the works, the people of Essen buy here in preference to patronizing the smaller dealers of the city; and the result is that Herr Krupp completely controls the prices of the goods, and has it in his power to ruin the trade of the small dealers if he chooses. That he sells the goods at a profit is proved, however, by the fact that the small dealers continue to thrive. The profits of the sales are used exclusively for the benefit of the workmen, directly or indirectly. Besides the central establishment, there are in each colony a number of what we would term grocery stores, which bring the produce directly to the doors of the consumers. All the sales are for cash.

In each colony restaurants are also established for the exclusive benefit of the Krupp workmen, where meals are served at so low a price that a man is amply provided for at one mark ten a day.

Space would fail to notice in detail all of the establishments created and controlled by Herr Krupp in connection with his workingmen's colonies. In each district there are schools where the children receive a good elementary education. In one of the colonies is a large grammar school, sustained and directed by the commune, though built and endowed by Herr Krupp. There are large hospitals, too, where the sick receive the best of care; and on the outskirts of the workingmen's quarter are isolating wards for contagious diseases. There are asylums for the aged and infirm, who have served over a certain time in the works, and insurance funds for the benefit of those who are killed by accident. A free medical service is established under certain restrictions, and large bathing-houses offer plain baths at four cents each, and vapor baths at one mark. Herr Krupp treats his men very fairly; better than would be expected when so many thousands are employed. After educating the children, the most promising are received as apprentices, and a limited number of those who show special aptitude are sent to an engineering school at the expense of the establishment. The hours of work are long and the pay small as compared with American standards, but that the men are satisfied is shown by the fact that there have never been any strikes or labor troubles of any sort. Of the total number of workmen, forty-nine per cent have been in the employ of Herr Krupp from one to five years; thirty-three per cent from five to fifteen years; and eighteen per cent from fifteen to thirty-five years; a pretty good showing, and one which speaks well for the relations between employer and employed.

The inhabitants of the colonies are quite as free from burdensome regulations as tenants in any city. All repairs are attended to by Herr Krupp, but the people are quite at liberty to fix-up their rooms, within reasonable limits, and though the terms run only by the year, no one is evicted unless he notoriously misbehaves himself, or fails to pay his rent. There is one institution in connection with the colonies, however, which seems rather strange from an Anglo-Saxon standpoint: namely, the establishment of liquor-saloons, or more properly beer-gardens, likewise the property of Herr Krupp, where the workmen can obtain all the good beer or spirits they want to drink, or to take home with them. Such a feature would be disastrous to the last degree in England or America, but the Germans do not seem to be troubled by it; at least there is no drunkenness reported in the colonies, though it is not lacking in the City of Essen itself.

It may be of interest to compare this German attempt at caring for the working classes, with what has been done under French influence at Mülhausen, and by Italians at Schio. Signor Rossi's colony in the latter city is certainly by far the most pleasing in appearance, and much more is done there to thoroughly educate the workmen and give them comfortable surroundings, than in either Essen or Mülhausen. But at Mülhausen each man is his own master, and the conditions of sale and ownership of property tend to develop individuality and self-reliance, which while perhaps inexpedient under all conditions, certainly work very successfully among the Alsatians. Considered simply as workingmen's colonies, Herr Krupp's establishments are by all odds the least satisfactory. The houses are well built but uninviting and barrack-like to a painful degree; hardly better than our own tenement-houses of the east side of New York; while the individual seems to be ignored, and the man is only one of 20,000, with everything about him, land, house, almost his clothing and food, held by the central ruling hand. The workmen are herded together in a manner which while doubtless a necessary consequence of their immense numbers, must be none the less uncomfortable to one who aspires to a home of his own. It is doubtful if any one would take a special pride in announcing himself as a resident of the Schederhof Colony, for instance, and we can hardly believe that any son of Herr Krupp would be contented to build him a house and live right in the midst of the workmen, as Signor Rossi's son has done at Schio. Herr Krupp has simply recognized the absolute necessity of providing for his workmen, who but for his care, would be undoubtedly a hundredfold worse off than they are. That he has met the necessity in a manner as economical as possible of land, material and money is no discredit to his benevolence, and whatever may be said comparatively the colonies at Essen and their adjoined institutions are deserving, of high praise. Not every wealthy manufacturer would do what Herr Krupp has done, even were the necessity as great.

C. H. Blackall.

To Mr. Blackall's letter we add a few extracts from an article by Mr. Edmund Hudson, published December 2, 1883, in the Boston *Herald*, and reprinted later by the War Department as "*Ordnance Note*, 328."

Mr. Krupp's system of administration is itself a fit subject for careful study. He is the sole owner of the great works which bear his name, but they are so organized and governed by his assistants, that he is left free to give as much attention as he pleases to scientific questions appertaining to the manufacture of steel, to new inventions, and especially to the construction of heavy guns. To attain this result he organized what is legally entitled the "Firma Fried Krupp," which is composed of himself, his son, and seven or eight gentlemen of the first order of ability, who are paid large salaries. Herr Krupp spends his time almost entirely at his residence, the villa Hügel. There he receives the members of the firm and the visitors who come to him from abroad. He need not visit his works for months together unless he chooses. His assistants carry on the vast business as if they were actual partners, and trouble him only with the things that he needs to know. Contracts are made and a great many important things are done which never receive his attention at all, because they do not require it. The employed members of the "firma" consist of gentlemen who have had experience in affairs before entering the service of Mr. Krupp. Several of them have been in the civil service of some of the German States. Each one has a special department of duties. Thus Mr. Cohnheim is a merchant; Mr. Erhardt, a special mining engineer; Mr. Gussmann, administrative employer; Mr. Yencke, administrative employer; Mr. Klüssel, lawyer; Mr. Longsdon, engineer; and Mr. Fritz A. Krupp, engineer. These gentlemen have their offices together in a plain building, centrally located in the works at Essen. They meet in a large room like a President's cabinet, minus the President, or an editorial consultation in the office of a leading newspaper. There is a vast correspondence, which is opened by one person and distributed among the various members of the firm and their assistants for consideration and reply. For every important communication relating to the business of Krupp, the signatures of at least two members of the firm are required. One of the signatures is necessarily that of the member who knows all about the matter in hand. The other signature may be merely formal. Thus it happens that persons or governments carrying on a correspondence with the establishment at Essen may find the signatures to their letters constantly varying, and I was told that not long ago the Danish Government made a special inquiry to ascertain how it happened that their letters from Essen were signed by so many different persons. The members of the firm above named are a sort of central bureau or cabinet, who are assisted by some three hundred clerks or draughtsmen, and this force constitutes the brains of the establishment. All the rest is merely the direction of labor, which is carried on by the foremen of the various shops and departments, as in other establishments. . . .

Here are a few statistics of the cast-steel works at Essen: Number of furnaces of all descriptions, 1,542; steam-boilers, 439; steam-engines,

450, with a total power of 18,500 horses; steam-hammers, 82; machines for working steel and iron, 1,622; railway-tracks of normal gauge, in length, 44 kilometres, with 14 locomotives and 539 cars; narrow-gauge railways, 26 kilometres, with 14 locomotives and 344 cars, 65 horses and 191 drays; 65 kilometres of telegraph-wire, with 35 stations and 55 Morse instruments. Among the most important buildings are the crucible-steel melting shops, puddled-steel shops, Bessemer-steel works (15 Bessemer retorts), Siemens-Martin-steel works, the great steam-hammer, steel-rail mill, steel-tire mill, plate-mill for iron and steel plates up to three yards in width, iron foundry for machine casting and for projectiles, containing eight cupola-furnaces, shops for the construction of locomotive and wagon wheels and bridge and girder work, spring-steel rolling-mill and spring shop, the vast gun-shops, etc. In the works are a chemical laboratory, a photographic and lithographic department, a printing-office with three steam-presses, and a book-bindery. The daily consumption of coal and coke is over 3,100 tons, of which 1,400 tons are used in the blast furnaces and steam-engines at Essen. . . .

The product of the works at Essen averaged is 1,000 tons of steel per day for each working-day of the year. Steel cannon, steel rails, steel car-wheels, steel shafts for steamships, all steel parts of locomotives, steel springs — these are the principal forms in which the metal goes forth to Krupp's agents and customers in every part of the world. The locomotive-supply business is an enormous department of the works. Krupp supplies the locomotive workers with every component part of the complete machine, but makes no locomotives himself. . . . One of the most interesting processes is the evolution of car-tire from a solid block of steel, which, by the use of the hammer and subordinate machinery, is expanded, until a ring of the proper diameter and circumference is formed without a weld. . . .

There is no more brilliant spectacle this side of the infernal regions than the casting of a huge block of crucible steel. This takes place at Essen three times each day. The crucible works are covered by a vast building open at the sides — simply a vast roof covering several acres of ground. All this space is required because the steel, which goes into the great mould, is melted in small crucibles, no one containing more than 80 pounds. These crucibles are carefully filled with bits of new soft iron, steel shavings, etc., in combinations which vary according as the metal is to go into cannon or crank-shafts or other forgings. These crucibles are placed in furnaces just below the surface of the ground and left covered in the heat for eight hours. During this time only a sufficient number of men is required to fill and deposit the crucibles in the furnaces, keep up the fires, which are fed from long underground corridors, and to prepare the mould, which is placed as near as may be in the center of the works. But at the appointed hour the scene changes from comparative stillness to remarkable activity. Men flock in by hundreds from every part of the works — for the largest castings 1,200 men are required to handle the crucibles. On the day of my visit there were only 400 men, but twice the number would not have made the scene a grander one. At a given signal the 400 leaped to their work. The long lines of furnaces were uncovered in a twinkling, and the men, with arms and hands covered, rushed to the brink of the seething fires and began to draw the crucibles. Three men lift each crucible from the white depths of heat, and then two others seize it with long steel clamps and run toward the troughs, through which the metal is made to flow into the mould, which is, like the furnaces, wholly under ground. The men strike the slag from the tops of the crucibles as they run, opening up the orifice at the top of each one for the pure metal to come out. There must never be any cessation in the flow of the metal until the last crucible is emptied; if there were, the whole would be spoiled. So the men shout, and hurry, and run, the sparks fly in every direction, and the black earth that we stand on seems to be taking fire. The heat around the troughs is something dreadful, and the men shout for pain, as well as excitement, as they rush back and forth with the gleaming crucibles suspended between them. When the last crucible is emptied the excitement suddenly ends, and the men rapidly disperse, but not until they have been given a drink of brandy, which is needed to offset the tremendous physical strain of the half hour which they spend in handling the crucibles. . . .

The fabrication of cannon is the matter of chief personal interest to Herr Krupp, who watches with the closest interest what governments in every part of the world are doing and proposing to do, relative to their armaments. Nearly every government, except England and the United States, has been a purchaser of Krupp guns, and there seems to be no cessation in the demand for them. . . . Krupp's preëminence as a gun-maker is unquestionably due to his early perception of the fact that steel must supplant iron in the fabrication of ordnance, and to his possession of such unrivalled facilities for the manufacture of steel in his own works. New ideas in the construction of ordnance I do not understand that Herr Krupp claims to have developed, but he was one of the first to perceive that breech-loading cannon would completely take the place of muzzle-loaders. It was this change which definitely forced the abandonment of iron in the construction of cannon in Europe. Krupp satisfied himself that the wedge-system of breech-closing was the best, and in spite of the conclusion of the French and English authorities that the French interlocking-system is superior, Krupp goes ahead, and shows no sign of giving up the system with which his name has come to be identified. . . . Every gun is tested on the grounds near the shops by being fired four times, and the large guns are then sent to Meppen, in North Germany, to be tested by the agents of the governments which purchase them, if such tests be desired. . . . The trials at Meppen are all for the purpose of testing the range of the gun — those at the works to test the strength of the gun. . . .

The system of apprenticeship at the works has received a good deal of attention from Krupp's managers, but has not yet taken on the proportions which it might be expected to fill. The term of apprenticeship is four years, and in 1882 there were 38 young men who completed it. A large proportion of the young men in Essen go into Krupp's service without any special course of training, the work which they perform not requiring it. The apprentices are all required to attend the "*Fortbildungschule*" in Essen, where they are taught drawing and a good deal of theoretical knowledge concerning mechanics. Their pay during the first year is from 15 to 20 cents a day, which is increased to 2 1-2 marks, or about 62 cents in the last year. Half of this is retained by the firm, and the thirty-eight young men who came out last year were paid an average of 677 marks, or about $130 each on the expirations of their terms of service. Comparatively small as is the number of apprentices, it is a fact that many of Krupp's most valuable and skilled workmen have been taught and developed in his own works since 1864, when the system of apprenticeship was begun. . . .

There is a regularly-organized fire department, consisting of 63 persons. There is a central station, with which 49 other stations are in electrical connection, 20 inside, and 29 outside of the buildings. The men are organized in seven different squads. They are regularly instructed, and have a uniform. With such a system a large fire in Essen is an impossibility. There has been in 17 years but one large fire in the steel works, which occurred in 1871. Records are kept of 13 smaller conflagrations and 345 very small outbreaks of fire which have occurred in the same period. Thus Krupp, with these enormous works so crowded together as to furnish a very inviting field for the fiery element, has never been a serious loser from fire, and is wholly relieved from all expense of insurance, which forms so important an element in the American manufacturer's balance-sheet. . . . The firemen work in conjunction with about 200 watchmen, whose duty it is to give alarm in case of a fire breaking out. Of course the hydrants cannot be located at every exposed point over so vast a territory, and there are eight two-wheel fire-engines, which can be moved about with the aid of a horse, and which may be called upon should a fire break out in any part of Essen. There are 29 ladder-stations within the works. The unmarried firemen are furnished with free lodgings at the central station, which is located as near as possible in the centre of the works, and the married men are furnished with dwellings as near as possible. There are 300 hydrants and 400 fire-cocks connected with the high-pressure service alone. . . .

Herr Krupp has discounted the communist movement by establishing a practical communism, which may well be studied by other manufacturers who wish to organize a successful business and to avoid all difficulties on the wage-question. His men know that on his ability to keep his furnaces and mills going when others may be idle or losing money, depends their assurance of steady employment, and American manufacturers who are disposed to complain because a similar spirit does not exist in the United States, will do well to stop and inquire whether, after all, they have done as much for their employés as Krupp is doing for his. Yet the hours in the cast-steel works are very long. The men all go to work at six o'clock in the morning all the year round. Those who work at the furnaces and mills go off at six in the evening, and the others at seven. In many of the departments a night-force is employed, in order to utilize the heat of the furnaces. For day-workmen a quarter of an hour is allowed for breakfast at eight in the morning, and another quarter of an hour for coffee at four in the afternoon. At noon the machinery stops for an hour and a half, and all the men who can do so go home to their families for a good dinner and some little relaxation. There is, at least, half an hour to read a newspaper or play with the children. Dining-halls are provided in the works for the men whose duties prevent them taking the full hour and a half at noon. Considering the share which German women are forced by their lords and masters in the agricultural regions to take in the performance of all the hardest drudgery on the soil, it seems rather surprising to find that women are not employed in any department of the cast-steel works. The men look strong and well. Three thousand of them are liable to be called out of the works and mines for military service in time of war. Herr Krupp being a valuable military ally for the government, however, he is allowed at the beginning of each year to designate to the government 500 to 600 of the men of the military age whom it would be essential to retain in case of a war, and thus the government guards against inflicting any embarrassment at the time when it might have the greatest need of utilizing his establishment. . . . The young men who go into the army come back much benefited in health and character by the service which they do there, and they are more valuable workmen afterward than they would be if they had no knowledge of military life. There is one significant difference between Essen and any American manufacturing town where men have regular employment — the apparent absence of much necessity for savings banks. It is a fact, however, that a savings establishment has recently been found necessary, and in future years it may, doubtless, have a more prominent place in the annals of Essen than it now possesses.

AMERICAN ARCHITECTURE AS SEEN BY THE FRENCH.

THE last issue of the *Moniteur des Architectes* contains reproductions of the sketches of Mr. Richardson's library at Malden, Mass., and of a safe-deposit building at Baltimore by Messrs. Wyatt & Sperry, both of which were first published in the *American Architect*, and as we have lately read of the growing esteem in which American architecture is held in England, it will be interesting to learn how French architects regard our work. We therefore translate M. Boussard's remarks at length:

"American architecture is exceedingly interesting to study in its manifold transformations; borrowing as it does from every style, from every form, from every epoch, its monuments are curiously instructive. A nation hardly formed, since it has not yet closed its

first century, tradition has not founded for it what we in the older countries of Europe style a 'school.' With us, in fact, all things form object lessons — houses and monuments, by contact with which the artistic percepticns of our children are developed and prepared for the instruction of 'the school.' In America, on the other hand, the new-founded city offers nothing for the meditatic n of the future artist, and for instruction in the precepts of the schools one has to seek abroad the traditions which the mother country does not furnish. Look at this library, for instance, and let us try to trace the origin of this structure, so antique of air and yet so newly built. Surely its architect has seen our European libraries, and one of them has impressed itself on his imagination by the grandeur of its style. Is it a library of our own epoch with which he has been smitten? Evidently not, for the *régime* of art of 1830, under which we still live, has always had for its end and aim the suppression of style: within, antique furniture and tapestries have been stored in attics to make way for the ready-made cabinets and so on, and the square house with green blinds has thrust aside the little Louis XVI *hôtels*. That which has impressed this American architect is the air of one of our libraries established midst the ruins of some old convent, of which the semblance is here presented. The cloister, more or less complete, serves as the court of honor, and also as a gallery of sculpture, fragments of which have been let into the walls of the portico. The principal staircase, enclosed in a projecting tower, detaches itself from the façade of the main building, against which the cloister gallery butts: one enters the building by a low door at the foot of these stairs. In the interior are vast halls, vaulted or ceiled with wooden ceilings, where are established the museum on the ground floor, and the library on the floor above it. We all know the kind of monument which with us simply indicates the utilization of some fragments of our past glories. The American architect, fortifying himself by our present practices, has construed our fragmentary work as indicating a principle, and builds a new monument according to the rules of this old conventual art. Was he right? Was he wrong? The question is worth considering.

"Conventual architecture, one cannot say it too often, is an adaptation of Roman architecture to the needs of our climate, and the greater part of its rules of construction are excellent. But it is also an adaptation made with the needs of conventual life kept clearly in view, and which must be eliminated in modern use. In fact, in our rainy climate, we need another form of portico than the Roman one which gives shelter only from the vertical rays of the sun, and the low and wide gallery of the French cloisters is an excellent typical modification. Next come the rooms of width and height enough to ensure abundant air for those who remain in them, and whose decoration and furnishing are suited to rooms in which climatic necessities compel the inhabitants to shut themselves at times.

"To apply these grand laws calls for great intelligence on the part of the American architect, it being understood that the climate of America is still more rigorous than ours, and that he is surely more wise than those of us who regulate their conceptions by the prevailing mode. But where this American architect sins is when his adaptation becomes a servile copy. In fact if the main façade, with its fragment of cloistral gallery, including also the stair turret, is more or less adapted to the purpose as exterior decoration, all the rest of the building is of a rustic, almost dilapidated, nudity, which is positively condemnable. The bare and miserable exteriors of our convents were a necessity of the times, in the first place, because no care was or ought to be given to outside decoration, and next, for analogous reasons, it was dangerous to call attention to the wealth and luxury within. With these exceptions, the conception of this library is an exceedingly interesting work to study."

Of the design for the building of the Mercantile Trust and Deposit Company, which we published on May 29th, 1885, M. Boussard exclaims:

"*Encore les Américains!* — True enough, but see how their architects work! These men have aimed at largeness, and they have succeeded perfectly. We can cavil at certain details of the façade through consideration for the harmony of style, but we must doff our hats to the result as a whole. This is indeed a place of deposit for commercial valuables, in which aspect of security is of as much real importance as the actual security. Apropos of this the plan is a most curious study. *Chers confrères.* Here is art well understood! Let us imitate in this Messrs. Wyatt & Sperry."

THE ILLUSTRATIONS

[*Contributors are requested to send with their drawings full and adequate descriptions of the buildings, including a statement of cost.*]

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[Gelatine Print, issued only with the Imperial Edition.]

IT may be in some slight degree instructive to turn from this print to the reproduction of the original design published in our issue for March 3, 1877.

PUMPING-STATION AT CLEAR STREAM, L. I. MR. A. D. F. HAMLIN, ARCHITECT, N. Y.

The Clear Stream pumping-station is one of four stations erected within three years to furnish Brooklyn with an auxiliary water-supply derived from gangs of driven-wells, which tap the remarkable underground stream of pure water which seems to traverse the western end of Long Island. The novelty, simplicity, and boldness of the system as here applied, have attracted much attention, and its phenomenal success has surpassed expectation, far exceeding the guaranty required by the city from Andrews & Company, of New York, the owners of the patents for this system, as a condition of its acceptance of the plant from their hands. At the Clear Stream station the wells number one hundred and fifty-two, arranged in two rows eighteen feet apart. The wells are of two-inch tubing eighteen feet apart in each row, connected by three-inch pipes with the great sixteen-inch collecting-main which lies between the two rows of wells and which is interrupted at its middle point by the receiver, from which start the suction-mains of the double pumping engines. The latter deliver the water into the city supply-main, which is not one hundred yards distant. Each well taps no water-bearing stratum at less than fifteen feet from the surface, but penetrates forty feet farther into the sand, and can be disconnected from the collector by a cut-off valve. It is thus seen that the system is very simple in theory. Its remarkable success in the Brooklyn stations is due largely to the perfection of the plant, and the extreme care and ingenuity bestowed upon its smallest details. The engines, which, in the stations at Clear Stream and Connselya's, are of the compound, duplex, condensing, fly-wheel type, were all built by the Knowles Company, and at each of the two latter stations have delivered fourteen million gallons *per diem* for considerable periods, ten millions being the amount guaranteed. For descriptions of the engines see the *Scientific American* of April 10.

The Clear Stream station is built of brick, faced with Croton brown brick, and with pressed and moulded brick trimmings. The woodwork is of oak, except the roof. This is carried by Georgia-pine trusses, with iron tie-rods, and is ceiled with white pine, and slated externally with Maine slates. The engines are placed as near the level of the water as possible, and are reached by steps from the boiler-room and platforms. The walls are painted internally a delicate salmon-color, relieved by bands of dark red at the level of the spring of the window arches, and by a wainscoting of enamelled brick up to the level of the window-sills, while the ceiling is of a shade of turquoise-blue between the trusses, which are varnished. The interior of the engine-room, with the handsome finish of the engines, is thus unusually agreeable in effect. It is abundantly ventilated by the dormers and gables, which were introduced into the design to avoid the necessity of an ugly "monitor top" over the roof. The whole building, with the engines, stands upon a heavy bed of concrete. The masonry and roof were built by day labor; the interior finish in oak is by Mead & Taft, of Cornwall, New York; the engines by the Knowles Company of New York; the well-plant by Andrews & Company, and the brass-work by the American Art Metal Works of New York. The cost of the building alone was about $9,000 to $10,000.

BAPTIST CHURCH, CORNING, N. Y. MESSRS. PIERCE & DOCKSTADER, ARCHITECTS, ELMIRA, N. Y.

THE church is of brick with Ohio sandstone sills, caps, etc. The basement has kitchen, pantry, dining-room and water-closets; the first floor has two parlors, robing-rooms, study, library, vestibules and audience-room, with seating capacity for four hundred and fifty. The second floor has two social rooms and library. The main social rooms, three in number, open directly in front of the rostrum, so that about three hundred sittings can be made available if desired. Smead-Ruttan system of heating and ventilating is used. Messrs. Allington & Sons, of Elmira, N. Y., have the contract for erection, and have the building inclosed. Cost complete about $18,000.

TOWN-HALL, PROVINCETOWN, MASS. MR. J. A. FOX, ARCHITECT, BOSTON, MASS.

THIS building is of wood, and is now in progress. The town offices are on the ground floor, and a public hall on the second floor.

WORKMEN'S HOUSES AT THE KRUPP STEEL WORKS, ESSEN, GERMANY. DRAWN BY MR. C. H. BLACKALL.

FOR description see article elsewhere in this issue.

OLD COLONIAL WORK. NO. VI, A MANTEL IN THE FORSTER HOUSE; NO. VII, A WINDOW IN THE PHILLIPS HOUSE, SALEM, MASS., MEASURED AND DRAWN BY FRANK E. WALLIS, BOSTON, MASS.

HOUSE OF J. R. FANNING, ESQ., ROCHESTER, N. Y. MESSRS. WALKER & NOLAN, ARCHITECTS, ROCHESTER, N. Y.

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House of J. R. Fanning
on Portsmouth Terrace
Rochester N.Y.
Melvin Nolan
Architect
Rochester N.Y.

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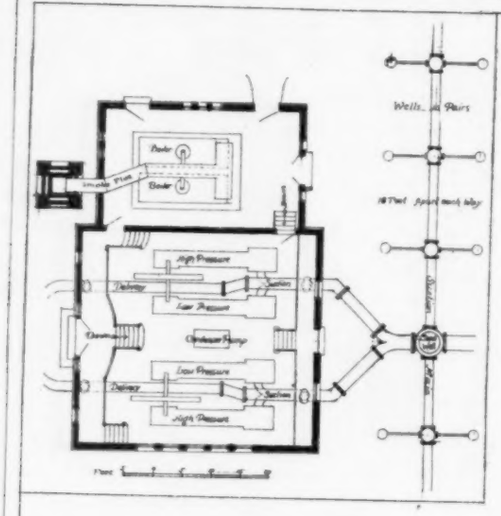

PUMPING STATION FOR BROOKLYN WATER WORKS: CLEAR STREAM: L.I. A.D.F. HAMLIN, ARCHITECT: N.Y.

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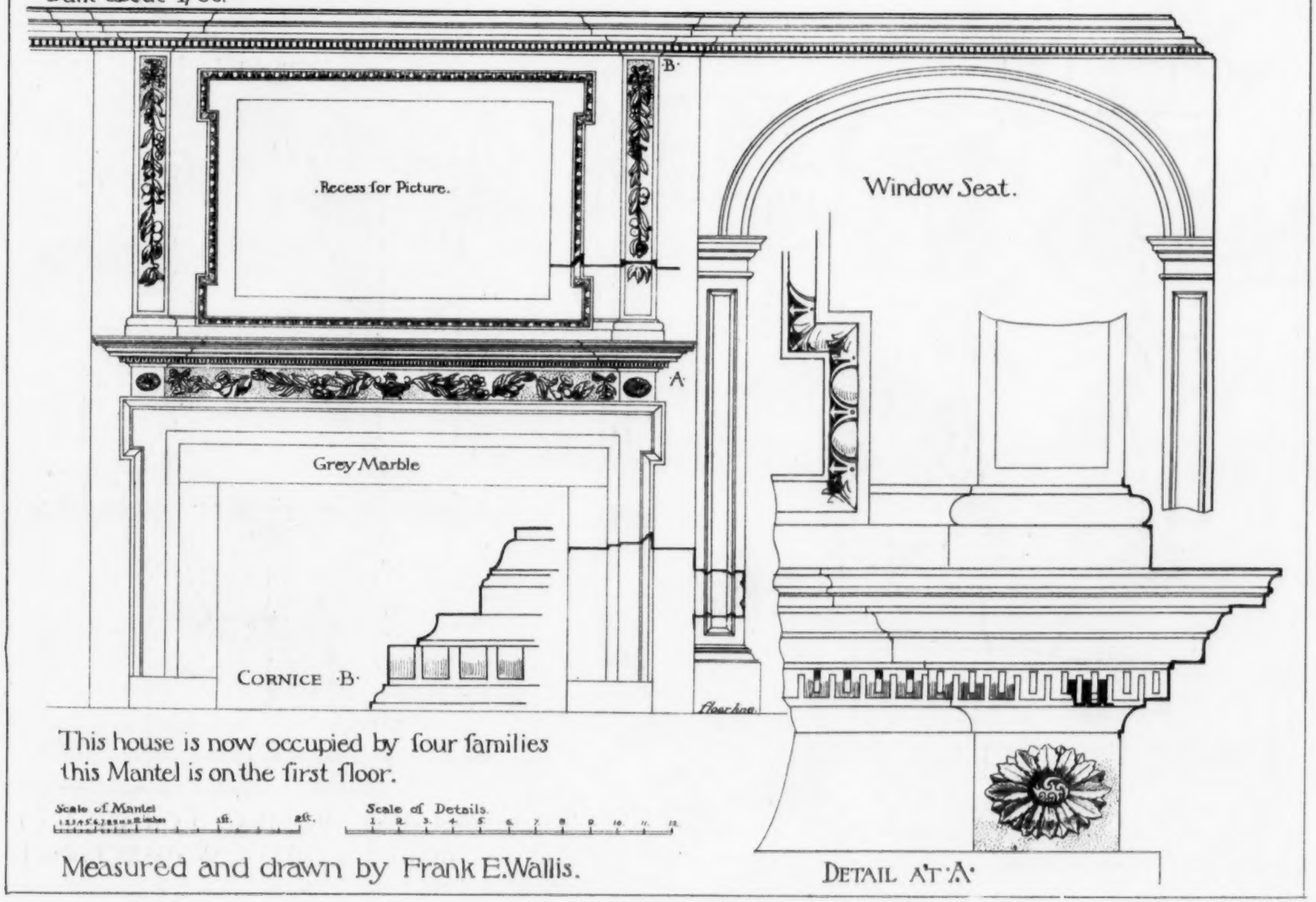
Forrester House Derby St. Salem Mass.

Built about 1780.



This house is now occupied by four families
this Mantel is on the first floor.

Scale of Mantel 1 2 3 4 5 6 7 8 9 10 11 12 Inches 1ft. 2ft.

Scale of Details 1 2 3 4 5 6 7 8 9 10 11 12

Measured and drawn by Frank E. Wallis.

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Old Colonial Work, VI.

AMERICAN ARCHITECT AND BUILDING NEWS, MAY 1 1886. No. 540

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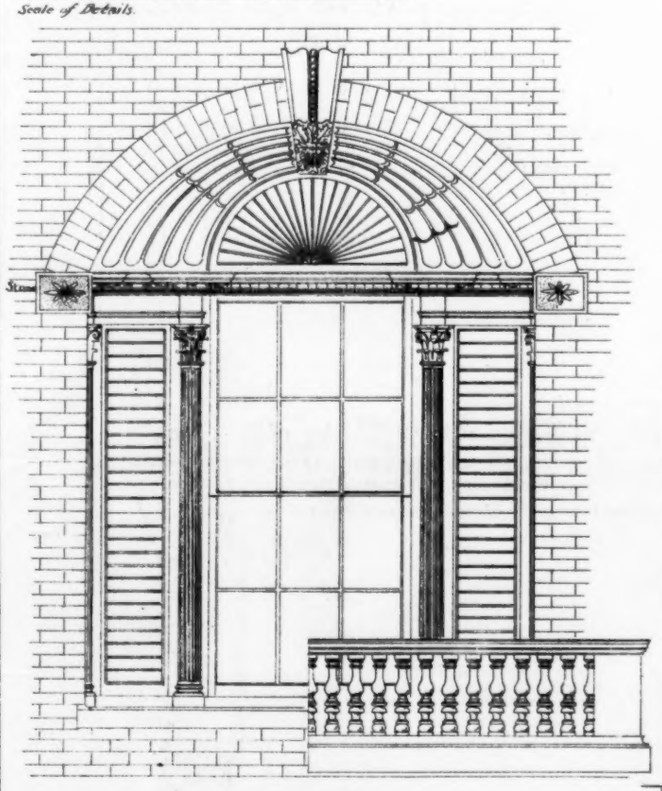
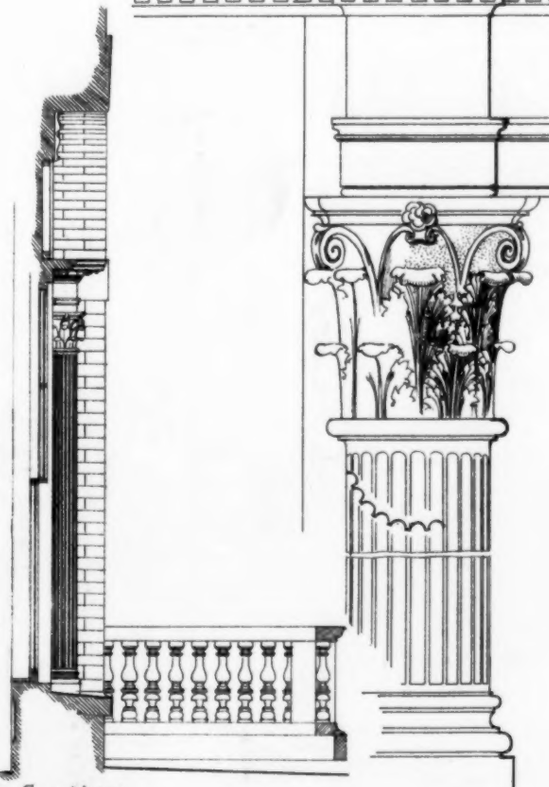
FRONT WINDOW "PHILIPS HOUSE"
CHESNUT ST., SALEM DATE ABOUT 1800.

Scale

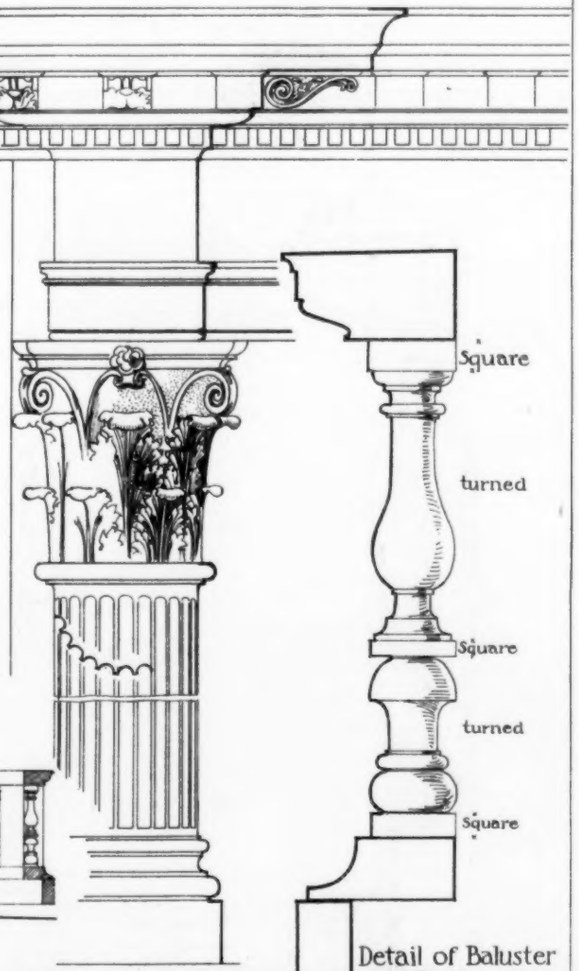
Scale of Details.



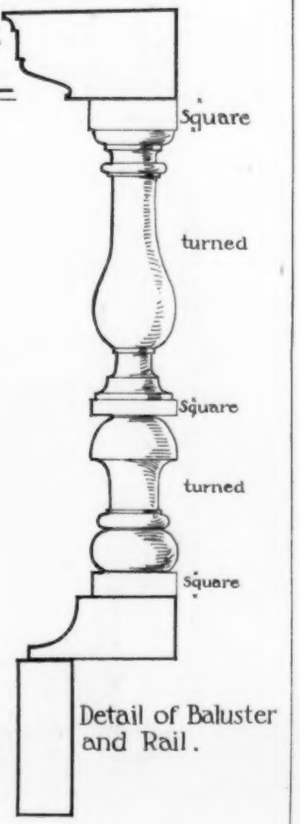
Elevation.



Section.



Column. detail.



Detail of Baluster and Rail.

Measured and drawn by Frank E. Wallis.

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OLD COLONIAL WORK, VII.

AMERICAN ARCHITECT AND BUILDING NEWS, MAY 1 1886. No. 540

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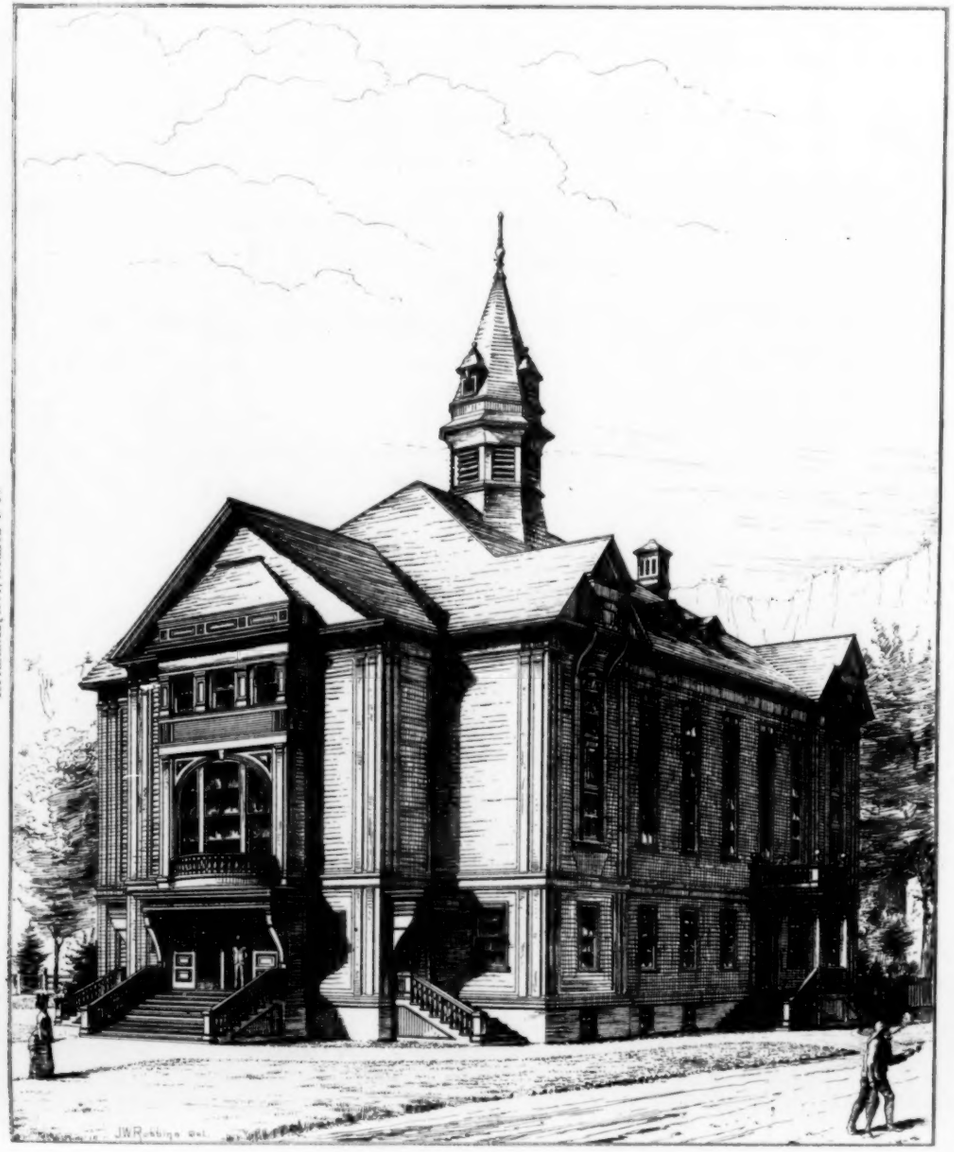
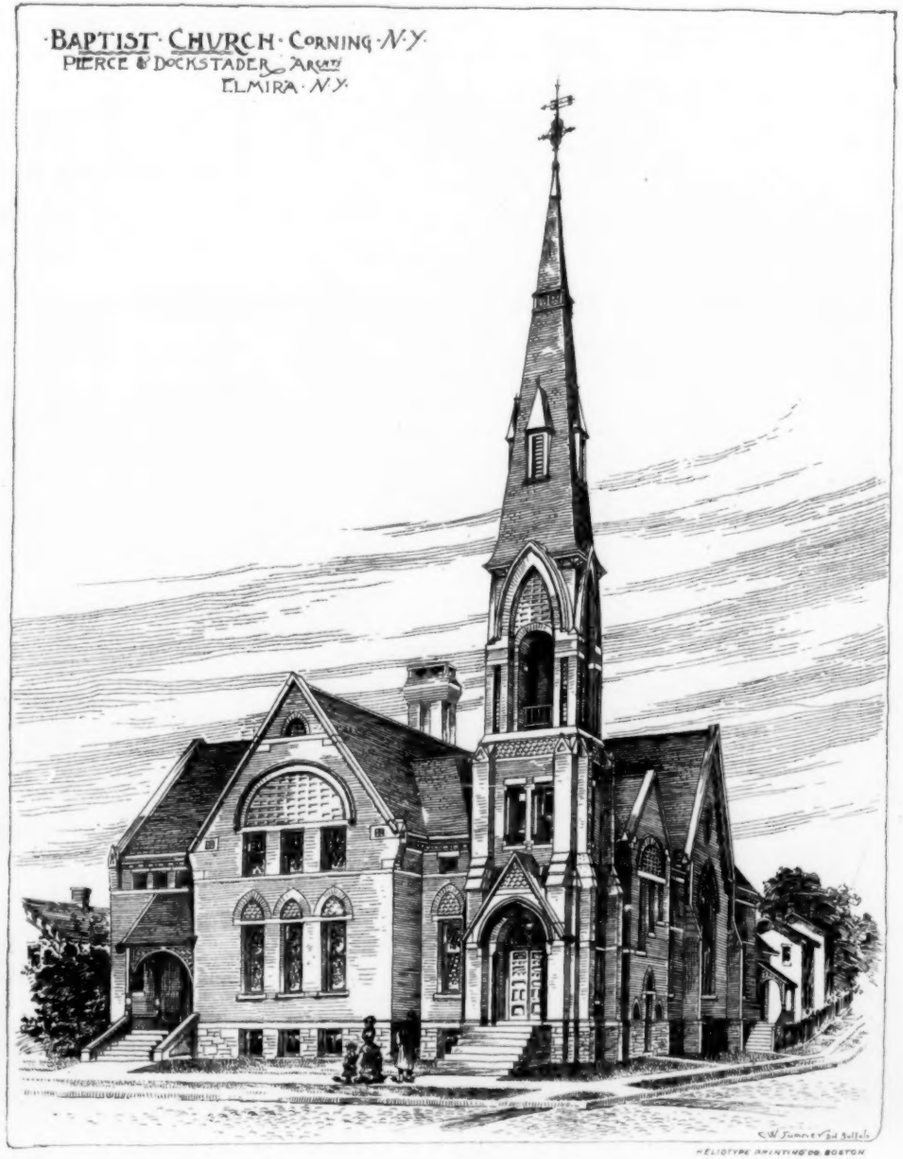


TOWN HALL PROVINCETOWN MASS John A Fox Architect Boston.

BAPTIST CHURCH CORNING N.Y.
PIERCE & DOCKSTADER ARCHTS
ELMIRA N.Y.



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American Architect and Building News, May 11 1886. No. 540

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Fig. 7. Drei Linden Colony.

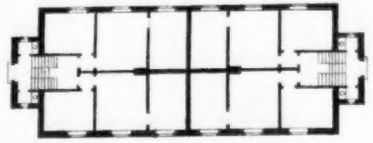


Fig. 2. Krönenberg Colony.

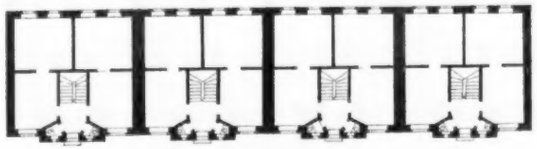
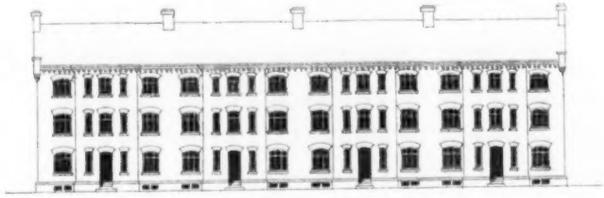


Fig. 4. Schederhof Colony.

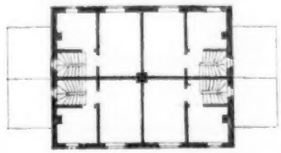


The Workingmen's Colonies of Herr Fred. Krupp.

Essen — Germany.

SCALE OF METRES

0 5 10 15 20 25



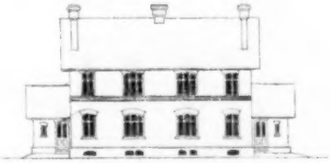
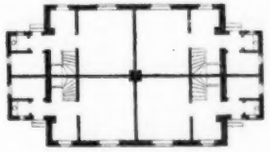


Fig. 5. Drei Linden Colony.



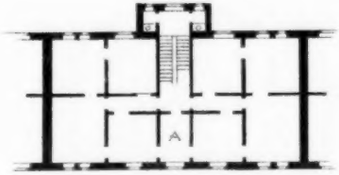


Fig. 8. Clerks and Superintendents.

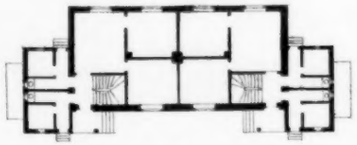


Fig. 6. Drei Linden Colony.

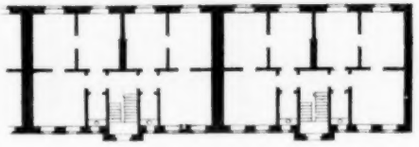
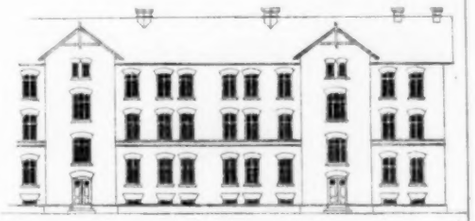


Fig. 3. Schederhof Colony.



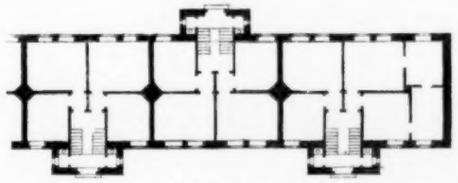


Fig. 1. Krönenberg Colony.

C. H. Blackall, Jr.

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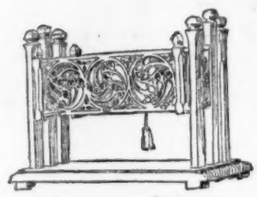
SAFE BUILDING.[1]—III.

WRINKLING STRAINS.



THIN pieces of wrought-iron under compression endwise may neither crush nor deflect (bend), but give way by *wrinkling*, that is, buckling or corrugating, provided there are no stiffening-ribs lengthwise.

Thus a square, tubular column, if the sides are very thin might give way, as shown in Figure 2, which is called wrinkling. Or, in a similar way, the top plate of a boxed girder, if very thin, might wrinkle, as shown in Figure 3, under heavy compressive strains. To calculate this strain use the following formula:

Fig. 2.

$$b = d.\left(\frac{w_r}{w}\right)^2 \qquad (4)$$

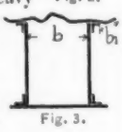


Fig. 3.

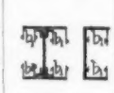
Where w = the amount of ultimate compression in pounds per square inch, which will wrinkle the material.

w_r = a constant,
d = the thickness of plate in inches,
b = the unstiffened breadth of plate in inches.

If a plate has stiffening ribs along both edges, use for b the actual breadth between the stiffening ribs; if the plate is stiffened along one edge only, use $4b_1$ in place of b. Thus, in the case of the boxed girder, Figure 3, if we were considering the part of top plate between the webs, we should use for b in the formula, the actual breadth of b in inches; while, if we were considering the overhanging part b_1 of top plate, we should use $4b_1$ in place of b in formula. For rectangular columns use 160,000 pounds for w_r; for tubular beams, top plates of girders, and single plates use 200,000 pounds for w_r. With a factor-of-safety of 3, we should have $\frac{160000}{3} = 53000$ pounds for rectangular columns, and $\frac{200000}{3} = 66000$ pounds for tubular beams, top plates of riveted girders and single plates.

For w we shall use, of course, $\frac{36000}{3} = 12000$ pounds, which is the safe allowable compressive strain. This would give the following table for safe unstiffened breadth of wrought-iron plates, to prevent wrinkling of plates.

TABLE III.

Thickness of Plate in inches.	Safe breadth in inches of Plate stiffened along both edges. (use b.)		Safe breadth in inches of Plate stiffened along one edge only. (use $4b_1$)	
	Rectangular Columns.	Tubular Beams, riveted Girders, and single Plates.	Rectangular Columns.	Riveted Girders and single Plates.
				
$\frac{1}{8}$	$2\frac{7}{16}$	$3\frac{3}{4}$	$\frac{5}{8}$	$\frac{15}{16}$
$\frac{1}{4}$	$4\frac{3}{8}$	$7\frac{9}{16}$	$1\frac{1}{4}$	$1\frac{7}{8}$
$\frac{3}{8}$	$7\frac{5}{16}$	$11\frac{3}{8}$	$1\frac{7}{8}$	$2\frac{13}{16}$
$\frac{1}{2}$	$9\frac{3}{4}$	$15\frac{1}{2}$	$2\frac{7}{16}$	$3\frac{3}{4}$
$\frac{5}{8}$	$12\frac{3}{16}$	$18\frac{7}{8}$	3	$4\frac{11}{16}$
$\frac{3}{4}$	$14\frac{5}{8}$	$22\frac{11}{16}$	$3\frac{11}{16}$	$5\frac{5}{8}$
$\frac{7}{8}$	$17\frac{1}{16}$	$26\frac{1}{2}$	$4\frac{3}{8}$	$6\frac{9}{16}$
1	$19\frac{1}{2}$	$30\frac{1}{4}$	$4\frac{7}{8}$	$7\frac{1}{2}$
$1\frac{1}{4}$	$24\frac{3}{8}$	$37\frac{13}{16}$	$6\frac{1}{8}$	$9\frac{7}{16}$
$1\frac{1}{2}$	$29\frac{1}{4}$	$45\frac{3}{8}$	$7\frac{5}{16}$	$11\frac{1}{16}$
$1\frac{3}{4}$	$34\frac{1}{8}$	$52\frac{15}{16}$	$8\frac{9}{16}$	$13\frac{3}{16}$
2	39	$60\frac{1}{2}$	$9\frac{3}{4}$	$15\frac{1}{8}$

The above table will cover every case likely to arise in buildings.

[1] Continued from page 167, No. 536.

Two facts should be noticed in connection with wrinkling:

1. That the length of plate does not in any way affect the resistance to wrinkling, which is dependent only on the breadth and thickness of the part of plate unstiffened, and

2. That the resistance of plates to wrinkling being dependent on their breadth and thickness only, to obtain equal resistance to wrinkling at all points (in rectangular columns with uneven sides), the thickness of each side should be in proportion to its breadth.

Thus, if we have a rectangular column $30'' \times 15''$ in cross section and the $30''$ side is $1''$ thick, we should make the $15''$ side but $\frac{1}{2}''$ thick, for as $30'' : 1'' :: 15'' : \frac{1}{2}''$.

Of course, we must also calculate the column for direct crushing and flexure, and in the case of beams for rupture and deflection, as well as for wrinkling.

Example of Wrinkling.

It is desired to make the top plate of a boxed girder as wide as possible, the top flange is to be $1\frac{1}{4}''$ thick, and is to be subjected to the full amount of the safe compressive strain, viz: 12,000 *pounds per square inch: how wide apart should the webs be placed, and how much can the plate overhang the angles without danger of wrinkling? Each web to be $\frac{1}{2}''$ thick, and the angles $4'' \times 4''$ each?*

For the distance between webs we use b in Formula (4).

$$b = 1\tfrac{1}{4}.\left(\frac{66000}{12000}\right)^2 = 1\tfrac{1}{4}.\ 5\tfrac{1}{2}^2 = 37\tfrac{13}{16}'',$$

which is the safe width *between* webs to avoid wrinkling.

For the overhanging part of top plate we must use $4b_1$ in place of b in Formula (4).

$$4b_1 = 1\tfrac{1}{4}\left(\frac{66000}{12000}\right)^2 = 37\tfrac{13}{16}, \text{ therefore,}$$

$$b_1 = \frac{37\frac{13}{16}}{4} = 9{,}453, \text{ or say, } b_1 = 9\tfrac{7}{16}''.$$

The total width of top plate will be, therefore, including $1''$ for two webs and $8''$ for the two angles, or $9''$, and remembering that there is an overhanging part, b_1, each side,

$$\begin{aligned} &9'' + b + b_1 + b_1 \\ &= 9 + 37\tfrac{13}{16} + 9\tfrac{7}{16} + 9\tfrac{7}{16} \\ &= 65\tfrac{11}{16}''. \end{aligned}$$

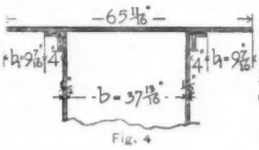


Fig. 4

By referring to Table III, we should have obtained the same result, without the necessity of any calculation.

Figure 4 will make the above still more clear.

LATERAL FLEXURE IN TOP FLANGES OF BEAMS, GIRDERS, OR TRUSSES, DUE TO COMPRESSION.

The usual formulæ for rupture and deflection assume the beam, girder or truss to be supported against possible lateral flexure (bending sideways). Now, if the top chord of a truss or beam is comparatively narrow and not supported sideways, the heavy, compressive strains caused in same may bend it sideways. To calculate this lateral flexure, use the formula given for long columns in compression, but in place of l use only two-thirds of the span of the beam, girder or truss, that is $\frac{2}{3}l$, and for w use one-third of the greatest compressive strain in top chord, which is usually at the centre.

Inserting this in Formula (3) we have:

$$\frac{w}{3} = \frac{a\left(\frac{c}{f}\right)}{1 + \frac{4l^2 n}{9\rho^2}} \text{ transposing, we have, } w = \frac{3a\left(\frac{c}{f}\right)}{1 + \frac{4l^2 n}{9\rho^2}} \qquad (5)$$

where a the area of the cross-section of the top chord in inches,

ρ^2 is the square of the radius of gyration of the top chord around its *vertical axis*; we must therefore reverse the usual positions of b and d, that is the breadth of top chord, becomes the depth or d, and the depth of top chord becomes the thickness, or b (both in formulæ given in last column of Table I.)

w is the greatest allowable compressive strain in pounds at any point to resist lateral flexure safely at that point.

$\left(\frac{c}{f}\right)$ is the safe resistance of the material to compression per square inch in pounds.

l is the total length of span in inches.

GLOSSARY OF SYMBOLS.—The following letters, *in all cases*, will be found to express the same meaning, *unless distinctly otherwise stated*, viz.:—

a = *area*, in square inches.
b = *breadth*, in inches.
c = constant for *ultimate resistance to compression*, in pounds, per square inch.
d = *depth*, in inches.
e = constant for *modulus of elasticity*, in pounds-inch, that is, pounds per square inch.
f = *factor-of-safety*.
g = constant for *ultimate resistance to shearing*, per square inch, across the grain.
g_1 = constant for *ult mate resistance to shearing*, per square inch, lengthwise of the grain.
h = *height*, in inches.
i = *moment of inertia*, in inches. [See Table I.]
k = *ultimate modulus of rupture*, in pounds, per square inch.
l = *length*, in inches.
m = *moment or bending moment*, in pounds-inch.
n = *constant* in Rankine's formula for compression of long pillars. [See Table I.]
o = the *centre*.
p = the *amount* of the *left-hand re-action* (or support) of beams, in pounds.
q = the *amount* of the *right-hand re-action* (or support) of beams, in pounds.
r = *moment of resistance*, in inches. [See Table I.]
s = *strain*, in pounds.
t = constant for *ultimate resistance to tension*, in pounds, per square inch.
u = *uniform load*, in pounds.
v = *stress*, in pounds.
w = *load at centre*, in pounds.
x, y and z signify *unknown quantities*, either in pounds or inches.
δ = *total deflection*, in inches.
ρ^2 = *square of the radius of gyration*, in inches. [See Table I.]
$\mathfrak{D}$ = *diameter*, in inches.
$\mathfrak{r}$ = *radius*, in inches.
π = 3.14159, or, say, 3.1-7 signifies the *ratio of the circumference and diameter of a circle*.

If there are more than one of each kind, the second, third, etc., are indicated with the Roman numerals, as, for instance, a, a_{II}, a_{III}, a_{IIII}, etc., or b, b_{II}, b_{III}, b_{IIII}, etc.

In taking moments, or bending moments, strains, stresses, etc., to signify at what point they are taken, the letter signifying that point is added, as, for instance:—

m = moment or bending moment at *centre*.
m_{A} = " " " *point A*.
m_{B} = " " " *point B*.
m_{X} = " " " *point X*.
s = strain at *centre*.
s_{B} = " *point B*.
s_{X} = " *point X*.
v = stress at *centre*.
v_{D} = " *point D*.
v_{X} = " *point X*.
w = load at *centre*.
w_{A} = " *point A*.

n is given in Table II.

Example.

A trussed girder is 60′ long between bearings, and not supported sideways; the top chord consists of two plates each 22″ deep and 1″ thick; the plates are 2″ apart, as per Figure 5. The greatest compressive strain on top chord has previously been ascertained to be on the central panel, and to be 525000 pounds. Is there danger of the girder bending sideways?

Fig. 5.

The girder is safe against lateral flexure so long as the strain at centre does not exceed w in Formula (5).

Now, the area $a = 2.1.22$
$= 44.$

Using 48000 pounds per square inch for ultimate resistance to compression of wrought-iron, and a factor-of-safety of 4, we have

$$\left(\frac{c}{f}\right) = \frac{48000}{4} = 12000$$

The length is 60′, or 720″, therefore
$l^2 = 518400.$

From Table II we have
$n = 0{,}000025.$

And from Table I, section Number 16, we have for the above cross-section,

$$\rho^2 = \frac{d^3 - d_1^3}{12(d - d_1)}$$

As we are considering the section for bending sideways, we must, of course, take the neutral axis $x \cdots y$ vertically, therefore d becomes 4″ and d_1 becomes 2″. This supposes the plates to be stiffly latticed or bolted together, with separators between. We have then

$$\rho^2 = \frac{4^3 - 2^3}{12(4-2)} = 2\tfrac{1}{3}$$

Then for w we have,

$$w = \frac{3.44.12000}{1 + \frac{4.518400}{9.\ 2\frac{1}{3}}\ 0.000025.}$$

$$= \frac{1584000}{1+2{,}47} = \frac{1584000}{3{,}47} = 456\,484 \text{ lbs.}$$

Or, we find that there is danger of the girder bending sideways long before the actual compressive strain of 525000 pounds has been reached. It will, therefore, be necessary to re-design the top chord, so that it will be stiffer sideways. This subject will be more fully treated when considering trusses.

TENSION.

In tension the load is applied *directly* to the material, and it is, therefore, evident that no matter of what shape the material may be, the strain will always be the same. This strain, of course, will be just equal to the load, and we have, therefore:—

$$s = w.$$

Where s = the amount of strain.
Where w = the amount of load.

The weakest point of the piece under tension will, of course, be where it has the smallest area of cross-section; and the stress at such point will be equal to the area of cross-section, multiplied by the amount of resistance its fibres are capable of.[1]

The amount of resistance to tension the fibres of a material are capable of is found by experiments and tests, and is given for each material per square inch of cross-section. A table of constants for the ultimate and safe resistances to tension of different materials will be given later; in all the formulæ these constants are represented by the letter t.

We have, then, for the stress:—

$$v = a.\ t$$

Where v = the amount of ultimate stress.
Where a = the area of cross-section.
Where t = the ultimate resistance to tension, per square inch of the material.

Therefore, the fundamental formula (1), viz.: $v = s.\ f$, becomes for pieces under tension:—

$$a.\ t = w.\ f, \text{ or:—}$$

$$w = a.\left(\frac{t}{f}\right) \qquad (6)$$

Where w = the safe load or amount of tension the piece will stand.
Where a = the area of cross-section at the weakest point (in square inches).

Where $\left(\frac{t}{f}\right)$ = the safe resistance to tension per square inch of the material.

Example.

A weight is hung at the lower end of a vertical wrought-iron rod, which is firmly secured at the other end. The rod is 3″ at one end and tapers to 2″ at the other end. How much weight will the rod safely carry?

The smallest cross-section of the rod, where it would be likely to break, would be somewhere very close to the 2″ end, or, say, 2″ in diameter. Its area of cross-section at this point will be:—

$$a = \frac{22}{7}\ .\ \frac{2^2}{4} = 3\tfrac{1}{7} \text{ square inches.}$$

The ultimate resistance to tension of wrought-iron per square inch is, from forty-eight thousand pounds to sixty thousand pounds. We do not know the exact quality, and, therefore, take the lower figure; using a factor-of-safety of four, we have for the safe resistance to tension per square inch:—

$$\left(\frac{t}{f}\right) = \frac{48\,000}{4} = 12\,000 \text{ pounds.}$$

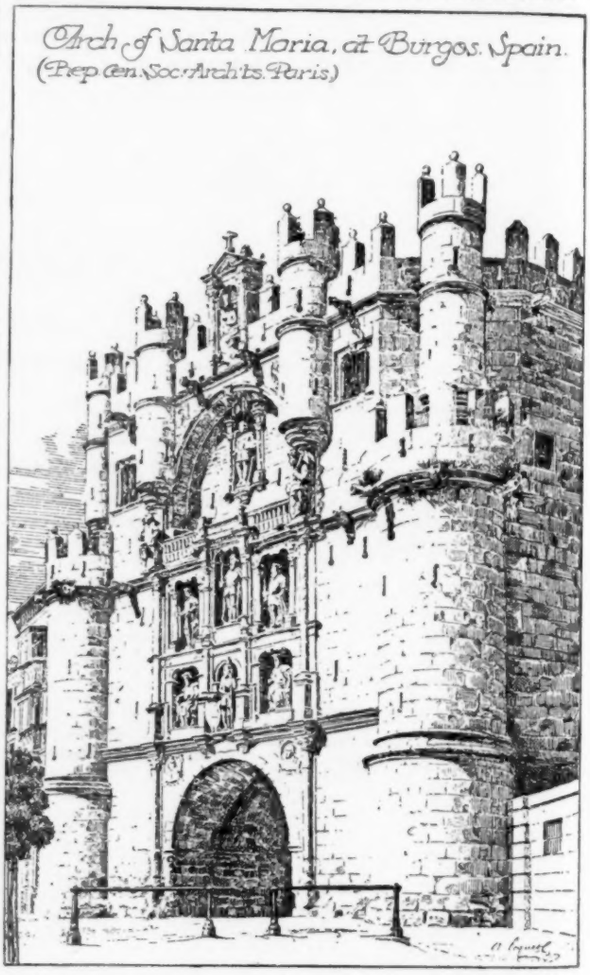
Therefore, the safe load will be:—

$$w = 3\tfrac{1}{7}.\ \ 12\,000 = 37\,714 \text{ pounds.}$$

[To be continued.]

[1] This, again, is not theoretically correct, as a piece under tension is apt to stretch, and so reduce the area of its cross-section; but the above is sufficiently correct for all practical purposes.

THE INFLUENCE OF ARCHITECTURE ON CARPENTRY.



THE last of the present course of free lectures delivered under the auspices of the Carpenters' Company was given at their hall in London-wall, a few weeks ago, by Mr. Banister Fletcher, M.P., F.R.I.B.A., who took as his subject the actual work of carpentry in all ages, and its action and reaction upon architecture. The facility which both architect and carpenter must each possess in order to attain excellence must be, the lecturer pointed out, the power of earnest thought on his work. The architect's was the inventive quality of art, the carpenter's was the actual work. The artist's pencil and the carpenter's tools, though wielded with the utmost skill, would, in the absence of earnest thought, produce but poor and imperfect results. Technical excellence had its limits, to be reached by patient study; but the production of a new design or an original thought could never be arrived at by simple study, however closely applied.

Turning a moment to consider the birthplace of architecture, it would be seen that a primæval civilization like the faculties of childhood could necessarily only conceive simple ideas, and these were converted into the first tangible forms of construction. The rapid architectural development of the earlier nations must be ascribed to the constructive faculty of mankind; but the epoch of simplicity of construction gradually yielded under the dominion of fresh requirements,

stimulating the forerunners of the art to increased efforts. The post and rail construction gave place to a more h mogeneous mode of building, and bit by bit construction more or less rude was added.

Man having satisfied the natural cravings for a mere shelter, commenced his first efforts at architectural embellishment, and the lecturer thought, even in these late days, advantage might be derived from a little more attention being paid to the sources from whence sprang the germs of architecture. In early buildings the carpenter held an important place, and he was, in fact, the architect, with the advantage over modern ones that he put his ideas into execution, so that he was able to import into his work the nameless something which stamped it with the impress of a master mind. After the final decay of architecture in its Southern birthplace, a new creation arose in its Northern borders, and it was to the new creation that we owed the roofs of modern Europe. During this period the art of carpentry advanced by leaps and bounds, till we stood gazing with awe and wonder on the marvellous beauties of construction left us in many a wide-spanned roof of church and hall. These were no formal copies of the work of preceding ages, but the mere outcome of earnest thought brought to bear on its new conditions. During the Norman period, the roof, though plain, was often open to the actual frame timbers. It was evident, from the weather mouldings which frequently remained to this day on Norman towers, that the outer roofs of this style were often of a high pitch, but sometimes they were very low. They appeared to have had generally, if not always, the beams placed very near together, on the under side of which a flat-boarded ceiling was perhaps made. It might be doubted whether any example of this period now remained, though we had sufficient evidence to show what they were in several instances. Portions of some very remarkable wooden roofs of this style remained at Oakham and at the Bishop's Palace, Hereford.

Of the Early English style a few roofs still remained in country districts, especially in Sussex. They were of steep pitch, and either canted or of a circular form like a barrel vault, and had generally tie-beams. Halesowen Parish Church, Salop, and one of the aisles of Rochester Cathedral had roofs with moulded beams clearly of Early English character; and at Old Shoreham was a tie-beam with the tooth ornament on the original circular braces.

Coming to the Perpendicular period, we find in Westminster Hall one of the finest specimens of a large span roof. The principals were here made into a sort of trefoil arch, and the interstices of the framing were filled with panellings; there were also arches from one principal to another. Of the same class were the roofs of Crosby Hall, Bishopsgate, and Christ Church, Oxford; but this type of roof was not common in churches where the flat, or nearly flat-ceiled roof was more usual. Half-timbered houses were frequently erected in this Perpendicular period, both in this country and in Germany and France. The houses of the richer burghers were often constructed in this manner, and were enriched with ornamental carving. This woodwork, while not belonging to art of a very high order, being generally entirely executed by the carpenter, was pervaded, as a whole, by a peculiar charm. In our own country, especially in Warwickshire and Cheshire, numerous picturesque specimens could be seen, and a holiday would be well and pleasantly spent in studying the examples remaining in Warwick, Coventry, or Chester. In most cases, if the works were minutely examined, it would be found to bear the impress of careful artistic work, rightly applied, although in many instances these were purely the action of the individual workman's ideas. However much work had been lavished on a building, seldom was the same moulding, stop, or ornament employed throughout, and this constituted the real charm of the treatment.

In order to show the advantage of living among and studying these works, the lecturer showed two moulded ends to beams, both the outcome of the workman independent of architectural control, both taken from buildings erected in Warwickshire. The one, which was refined in all its details, was taken from the neighborhood of artistic old work; the other, debased and clumsy in character, was surrounded by stucco and sham art. Much in the same way architecture always affected carpentry, and he held that it was only by architects working up to a high standard of art that the workman could improve himself.

In discussing these wooden house fronts, roofs, and other huge pieces of mechanism, which developed in boldness and variety, it should not be overlooked that the abundance of oak timber in the north of Europe both suggested much of this art, and admitted of bold features of construction from the size of the logs and the tenacity of the material. Timber was in the fifteenth century to be had at low prices and in any quantity. Whole cities were mainly constructed of timber. The houses were framed together with posts about sixteen inches square in section, arching outwards, and meeting the projecting floor timbers, and so with the upper stories. In the Rows of Chester, an open gallery or passage was left in the first floor within the timbers of the house fronts. Projecting oriels often jutted out from these overhanging stories, and the spaces between these framing pieces were filled-in with laths and mortar, or in later years with glass. In London, Rouen, Blois, and Coventry, the angle-posts were occupied by niches having statuettes in them, or fifteenth-century window-tracery was sunk in the surfaces. Most of the ornamental work to the early half-timbered houses was confined to the ends of joists, beams, and posts, and it was not till a later date — about the sixteenth century — that the panel spaces were filled in with useless ornament, having nothing to do with the construction, and in no way improving the beauty of the work.

He would, in the next place, consider carpenter's work in furniture, both ancient and modern, with a view of inquiring if even in this branch of work the carpenter had not had some share in aiding the cause of progress. In the British Museum were preserved some Egyptian chairs which, from the simplicity of their construction, were well worthy of a visit, putting aside their wonderful preservation after the lapse of centuries. Another old piece of furniture was St. Peter's Chair, at Rome, and this old piece of work, though at times repaired, still retained much of its ancient character. During the sixteenth century especially, furniture possessed an architectural character in its outlines. In the fifteenth century, chests, screens, stall fronts, doors and panelling followed or fell in with the prevailing arrangements of architectural design in stonework, such as window-tracery or wall-tracery. But in the sixteenth-century, furniture, architectural character not proper to woodwork for any constructive reason was imparted to cabinets, chests, etc. They were artificially provided with parts that imitated the lines, brackets, and all the details of Classic entablatures when these had constructive reasons, but which, reduced to the proportions of furniture, had not the same property. These subdivisions brought into use the art of "joinery." As the vigor of the great sixteenth-century movement died out, the mania for making furniture in the form of architectural models died out also, nor did it again become the fashion until quite modern times, under the Gothic and other revivals, at the end of the last and the beginning of the present century. The architectural idea was in itself full of grandeur, and productive of very beautiful examples in the sarcophagus-shaped chests or cassoni or cabinets, although the façades of temples, the vaults, columns, and triumphal arches of Rome would not bear reduction to such small proportions. With the introduction of marquetry into more general use, there was apparent, not only a new or renewed method of decoration, but a changed ideal of construction. Pieces of furniture were no longer subdivided by architectural mouldings and columns, all such meant extra work added to the sides and fronts.

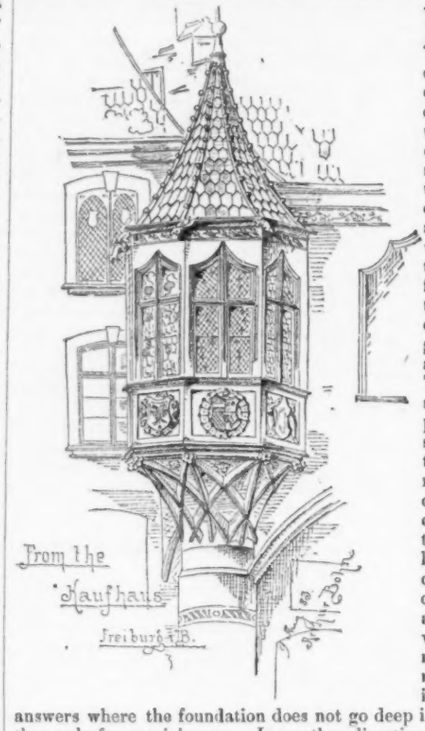
The lecturer asked why modern carpenters had not taken in hand some of the work required in designing and executing furniture. At no period had there been such a demand for good, sound, solid and substantial work in this direction, work, in fact, well within the carpenter's domain, and a large field was open to the craft in the future. Why should not the hall furniture of a modern house fall entirely to the share of the carpenter? Mr. Fletcher exhibited some hall furniture he designed for his own residence and had executed solely by carpenters some seventeen years ago. They had thus seen in their survey of art, as far as traced, a continual progress of human ideas and conceptions, beginning with evolution, followed by imagination, and completed by adaptation. When they looked from their present standpoint of critical examination as to the real manner and use of the various means of construction, it must be counted an anachronism that their predecessors of the last century, incapable of comprehending the true spirit of preceding ages and the principles on which their work was based, should have been so fond of reproducing archaic forms of construction, false alike in art and principle, and unsuited to a material in which they wrought. The error into which they fell was that they attempted only to reproduce the forms of older work without regard to its spirit. What we wanted was the love of truth that animated the workers in olden times, and when we had mastered the first principles of such a revival, we should be on the high road to success. The designer should so use every material dealt with as to bring out its distinctive properties. One great and too common error was that of not letting well alone. How often did we find a well-moulded beam spoilt by the addition of meretricious ornament, having nothing in common with the member itself, and injuring by its presence what it was intended to enhance.

As a result of the spread of technical schools, art was, he was pleased to notice, making its influence felt in our workshops, and he was hopeful that in the not far distant future our workmen would take their right place in the hierarchy of art, and a better understood connection between the arts of construction and design would assuredly be the outcome. More than anybody, the carpenter had greater opportunities in the present day of improving his knowledge. Nearly every modern roof proclaimed the fact from the housetops. The roofs of our Georgian forefathers were perhaps nearly without exception the most unobtrusive frauds of a sham age. Concealed between lofty parapets from without, and by lath and plaster from within, sham construction and scamped work went on hand-in-hand unchecked; but a change for the better had now opened, and instead of seeking to hide his work, each architect vied with the other to show more and more both of the roof and its construction. No one could deny that the change was for the better. The man of all others to whom our thanks were due for this alteration in public taste was the late Mr. Pugin. He it was who first played havoc with the old tie-beam school of construction, without which the whole superstructure of collars and braces would have fallen to the ground. In our enthusiastic effort after the ideal we were sometimes apt to adopt archaic forms, which in our sober moments we were sorry for. He referred more particularly to the debased form of French and Flemish roofs just at present in vogue of the bedpost order, wherein the canons of the constructive position of materials was set at nought. The old carpenters evolved from their experience the constructive excellence that we found in most of their work. We must not, in our efforts to be eclectic, sin on the other side, and lose all trace of real worth. One point that was sometimes overlooked in adapting

old examples by rule of thumb was that the adapters failed to take into account the age in which the works were executed. The extra strengths of timbers in old roofs had been the main cause of their stability. Parts evidently designed under the direct laws of stress, intended originally to act as a strut, had, under changed conditions, come to serve the purpose of a tie, and if, on examination, the piers had given way, we might be certain that some power other than originally intended had been exerted, as pins could never have been properly utilized where tension of the part was presupposed. The peculiarity of the present position of architecture was the reversal of the conditions under which it progressed. In the past the secular element was subordinated to the religious conception; now the utititarian preceded all others, and it was the multiplicity of the requirements of our latter-day architecture that made the fulfilment so difficult a task. It was the continuation of the analytical and synthetical methods that was now necessary to elaborate a definite system. To the young man starting in life his advice was: study anywhere and everywhere, but learn to sift the tares from the wheat, striving to remember that old work was not necessarily good because it was old. If the young could strip self and learn to follow the spirit that animated the constructure of the thirteenth century — the period when construction had attained its full development — without copying all its forms and conditions, he would eventually retain something worth knowing. The unfortunate part of it was that the workman, like too many members of the architectural profession, only make bad copies of the old forms, taking little heed of the different conditions and requirements of the work. Mr. Fletcher quoted from the late G. E. Street's last address at the Institute, in which solid construction was insisted upon, and from a recent Academy lecture by Mr. Aitchison, pointing out that construction was best when it decorated the material employed for construction. The lecturer continued: I think that jerry building has had its day, that the work of the future will be solid, substantial work, that solid woods will be used, and veneer discarded. I find houses built from my designs, and in a solid manner by so-called speculative builders let and sell far more quickly, though a larger price is asked for them than for the usual flimsy class of house, whereas these stronger, more solid, and more expensive houses would not have let or sold a few years ago. In my judgment, therefore, the time has arrived when to build solidly and well will pay best even the speculative builder, and this will make the carpenter more than ever in request if he will give his attention to technical knowledge. The scope of his trade will be increased, for the demand for solid and substantial houses will influence the furniture therein, and the carpenter and joiner may certainly make the hall and dining-room furniture, the panelling of ceiling, in conjunction with enamelled iron, the dadoing of halls and rooms, the solid parquetry of floors. The great thing that the carpenter must remember is that he must cultivate taste, for this now pays, and its cultivation is one of the weapons we have against foreign competition. Everything the carpenter does should bear progress of his trade; all being solid, simple, yet tasteful. Where he can, he should build his cottage with some portion of half-timbered work, barge-boards, etc., if not prevented by local regulations; he should be content with bare walls at first, and gradually panel and fit up each room. Nothing will more help to elevate his own taste and the taste of his neighbors, and it should be borne in mind that he will be educating himself as an art workman, and thus the carpenter will be helping to influence the architecture of the future.

Painting Microscopic Slides. — An exchange tells of a visit to the house of a microscopist, who thus describes some of his treasures: "I have several little things to tell you that are not known except by microscopists. Here is a slip of glass, for instance," he continued, as he picked up a narrow glass-slide, "which contains the representation of a beautiful bouquet of flowers. The representation, when looked at with the naked eye, can scarcely be seen at all. It simply looks like a small shot. The bouquet, when you look at it through the instrument, contains, as you can discover, eighty-two distinct flowers of various shades and colors; and each is as perfect as it would be possible for an artist to represent it on canvas. The entire bouquet, including all the flowers, leaves, etc., was made from the scales and hair of Brazilian butterflies. The dust from the wings of the butterflies was picked up and placed in position by Henry Dalton, of London, who is now dead. Dalton, with the aid of a microscope, picked up one particle of the dust at a time on the end of a hair, and adjusted it to the slide in such a manner that, when his task was finished, the bouquet assumed its present beautiful and perfect form. Although Dalton was dissipated, he excelled most of his imitators in his peculiar line of art. Among microscopists his works are prized as highly as the works of the great masters in painting are valued by artists who work on canvas. A painter who can paint a complete scene on a surface as small as a sleeve-button is considered skilful; yet Dalton used a single hair for a brush, and dealt with particles of matter scarcely visible to the naked eye, which he placed in their respective positions with the aid of his microscope with such accuracy that he finally produced his representations, which are so correct in every detail that artists who have examined them critically have been almost overcome with astonishment. This is what I call one of the wonderful achievements of the century. He was a fast worker, and, by laboring almost incessantly, he could finish it, I think, in the course of a week or ten days. The Dalton slides are very valuable in America. There are not more than fifty Dalton slides in this country, and they can scarcely be purchased for love or money. In fact, as I have said before, they are as highly prized by microscopists throughout the world as a rare painting by a celebrated master is prized."

A NEW SYSTEM FOR SUBAQUEOUS FOUNDATIONS.



In carrying out pneumatic foundations an iron caisson of the form of the object required is generally used as a working chamber. The masonry carried up upon this is usually constructed within an iron sheathing, which serves to protect the new work from injury by friction as it is pressed down into the ground, and also acts as a coffer-dam. The caisson and the sheathing remain permanently in the structure. Many attempts have been made to lessen the cost of this system, caused by the loss of the iron. Works have been carried out in which the caisson served only as a diving-bell, and was afterward removed; but this method, apart from its great cost, only answers where the foundation does not go deep into the bottom, and then only for special cases. In another direction saving of cost has been sought by removing the upper iron sheath after the masonry has been carried up sufficiently high and using it again.

Already in 1851 Pfanmüller had suggested, in a scheme for bridging the Rhine at Mainz, that the upper portion of the iron sheaths for the piers should be screwed off when the masonry was carried up above the water-level, and used again at another pier. In the case of the Saltash Bridge, Mr. Brunel removed the iron cylinders, thirty-seven feet in diameter, for the whole depth of about fifty-six feet, in which the piers were not imbedded in the bed of the estuary. In constructing the Antwerp quays the contractors built the masonry, which was founded upon pneumatically-sunk caissons within massive iron sheathings, which, when the masonry was far enough advanced, were unbolted from the caissons, lifted bodily and reused at another part of the wall. As the foundation of the masonry did not go far into the solid, the friction to be overcome in lifting these sheathings was not great.

In 1882 the Società Italiana began the founding of a quay wall about two hundred yards in length along the corrected course of the Tiber for the protection of the Villa Farnesina. The work was all done in the dry, the great curve of the Tiber not being cut out till later. The wall was founded upon a series of iron caissons, sixty-five feet seven inches long, fifteen feet nine inches wide, and twenty-nine feet six inches deep. The masonry was brought up for twenty-three feet in rough tufa and puzzuolana mortar, and for the remaining six feet with a facing of travertin blocks. A sheathing of unusual construction, which was put up to its full height at once, was used, perhaps rather as a protection during the sinking for the rough masonry in slow-setting mortar, than as a coffer-dam in which to build the upper masonry. This sheathing consisted of vertical iron plates 23.6 inches wide, connected together by two flat bars riveted together between which the edge of the plates was pushed. There was no filling or calking of the joints, and no attachment to the caisson. When a length of walling was finished, the plates and bars were pulled out and used again in another length.

Inspired by these works, Mr. Gaertner designed a "foundation mantel," which easily takes to pieces, and is adaptable to any form of caisson. It consists of vertical plates, 0.2 inch thick and two feet seven inches wide, in six foot seven inch lengths, joined together at the horizontal points by double cover-plates and a double row of bolts. Laterally these plates are kept in position by fitting into a riveted I formed of two bars, 5.09 inches x 0.47 inch, separated by a bar, 2 inches x 0.27 inch, all three being riveted together. The vertical plates are not fastened to these I-irons, but the joint is calked. The I's break joint with the plates, and are only lightly attached to the caisson.

In the winter of 1883–84, the two abutments and two piers of the bridge over the Wisloca at Dembica, in Galicia, were erected upon this plan. The area of the foundation of the abutments is sixty-eight square yards each, and of the piers fifty-seven square yards.

[1] Abstract in the Ex. Min. of Proc. of the Brit. Inst. Civil Engineers of a paper by E. Gaertner in the *Wochenschrift des Oester-Ingenieur und Architecktен Vereins.*

The foundations varied in depth from twenty to twenty-six feet below low water, and from twenty-eight to thirty-seven feet below the ground level, and four to five rows of the movable plates were used, according to circumstances. The materials sunk through were sand and gravel first, and, lower, stiff clay. When the foundation of one pier was completed and the masonry brought up high enough, the sheath was removed to the next pier. It was used four times.

To obviate any danger of bolt-heads or other projecting pieces catching on the masonry as it is being drawn out, the space between the sheath and the masonry is filled with sand as the latter progresses. The sheath is removed by windlasses, which draw out the vertical plates and fish-joints one by one. The joint between the sheath and the caisson is simply broken in this operation. The weight of the sheath, including all joints and fastenings, is for the lowest row of plates nineteen pounds per square foot, and for the rest 15.6 pounds. If the plates have to be re-used over a caisson of different shape from the one from which they are being taken, it may be necessary to bend them to the required curve, and to this end they must be of the best material; the vertical fish-joints are the same for all shapes of caisson. It has been intended to make careful tests to ascertain the amount of friction encountered in drawing off the sheath, but the floods of June, 1884, made it necessary to get the work done as soon as possible, and the tests were therefore confined to the right pier, which was one hundred and fifteen feet from the bank, and founded 21.6 feet below low water, and thirty-eight feet below the surface of the ground, made up of

Sand and clay	10.50 feet
Loose stones and sand	18.60 feet
Firm clay	8.90 feet

While the sinking of one of the caissons was in progress, the giving way of the joints of two of the vertical plates at their joining with the caisson gave the opportunity of calculating the external friction, the bottom of the caisson being at the time 5.2 feet below low water, and 23.3 feet below the surface of the ground. This gave a resistance due to friction of 5.1 tons per foot run of circumference, equivalent to 492 tons per square foot of surface of the sheathing. These and some observations of other plates which gave way on the further sinking of the caisson, taking into account the degree in which they followed the caisson or stayed behind, showed that the earth pressure on the inside of the sheathing is proportioned to the friction, just as is the case on the outside.

These slight observations showed that the co-efficient of friction inside is at least as great as, if not greater than, that outside, and that, therefore, passive earth-pressure produces as great an amount of friction as active earth-pressure. It was now of interest to determine the resistance to friction when both surfaces of the sheathing were sliding, as is the case when the sheathing is drawn off, instead of only one, as in the former cases, and whether, as must be theoretically assumed, the resistances work simultaneously on both sides of the plate, and are thus proportional to the sum of the inner and outer co-efficients of friction. If this is so, a comparison of the theoretical calculated outside friction with the observed resistance to the drawing-up of the sheathing should show the former to be at most one-half the latter. The calculations have been made for all the cases in which the plates were above water (there being no theory giving useful results for material permeated by water).

The theoretical earth pressure was determined by Rebhann's construction, in which the weight of the material was taken at 98.3 pounds per cubic foot, and the angle of repose for sand with loam at 38°, and gravel and sand 36°. After a long series of observations, the co-efficient of friction for the outside was found to be 0.466, and for the inside 0.588, or twenty per cent greater than the outside friction. The results of the calculation were reduced to diagrams which thoroughly proved that with the simultaneous action of two surfaces of the same body (as in the case of the sheathing when being drawn off) the resistances to friction act simultaneously on the two surfaces, and therefore must be added together.

a.	*b.*	*c.*	*d.*
Depth below surface of ground in metres.	Mean resistance to the winding up of the vertical plates of the sheathing.		
	Per plate 2 ft. 7 ins. wide.	Per metre of circumference of sheathing.	Per square metre of sheathing.
	Tonnes.	Tonnes.	Kilograms.
1.0 (3.28 feet)	0.140 (0.138 ton)	0.177 (0.053 tons per foot)	177 (36.3 lb. per sq. ft.)
2.0	0.560	0.709	354
3.0	1.390	1.759	586
4.0	2.620	3.316	829
5.0	4.560	5.772	1,154
6.0	5.570	7.025	1,171
6.5	6.290	7.962	1,224
6.75	7.290	9.227	1,367
7.10	9.150	11.582	1 631
7.50 (24.6 feet)	11.310 (11.13 tons)	14.316 (4.235 tons per foot)	1,908 (391.1 lb. per sq. ft.)

The above table refers to the land pier on the right bank of the Wisloca. From this table it is seen that the friction at considerable depths, and especially where the earth is saturated with water, increases very rapidly. The mean water-level in the case of the pier to which the table refers was about 4.7 m. (15.4 feet) below the surface of the ground. The observations and calculations described in the paper were made by Mr. Adolf Titze, who was the engineer in charge of the works on behalf of the firm who built the bridge, the author of the paper being a member of the firm.

COMMUNICATIONS

[*We cannot pay attention to the demands of correspondents who forget to give their names and addresses as guaranty of good faith.*]

THE EFFECT OF WIND ON PLUMBERS' TRAPS.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — In a two-story house, with a horizontal run of soil-pipe of about thirty feet, from a running trap to the vertical part about forty-five feet high, about which were grouped in basement, first and second story the usual fixtures each with its own branch from soil-pipe, I recently observed the effect of a rather high and "gusty" wind. The fresh-air inlet was two inches, the soil-pipe four inches, open at top, extending well above ridge of a gambrel roof, but ten feet or so from the ridge. The closet was a short hopper, and most of the traps of other fixtures were S-traps with five-inch seal, and not vented. Although the discharge of any fixture in this house has scarcely any effect on the seal of the trap of any other fixture, yet this wind caused a rise and fall of nearly, if not quite, one and one-fourth inches. This was no more of a wind than might occur a half-dozen times in an ordinary season. This is a case that vent-pipes would not help, and had the shallow traps, so common, been used, the house might have been favored with air from the pipes.

It has been fashionable among architects to make game of ventilating caps, but the subscriber purposes to try some of them and see if they will steady the water in these traps. MR. PINCH.

BRIBES.

NEW YORK, April 26, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs,— Alluding to your article in the number for April 17th, entitled "Corruption Again," permit me to say that I fear the evil is more deeply rooted than at first sight appears. Certainly in this community, outside of professional circles, the custom of taking and giving commissions for any service is generally prevalent, and to refuse to pay would be regarded as dishonorable, while to reject an offered payment would seem, to most men, mere Quixotism. From the tip to the waiter, to the cash to the alderman, every one seeketh gifts and followeth after rewards. Nor is it an epidemic of recent appearance — it has grown year by year — the causes are below the surface; unless I am much mistaken, you will find it increase, rather than diminish in the future. The strength of it lies in the fact that it is more difficult to get work to do than it is to do it, and to change this condition of affairs will require more than hopes.

Respectfully yours, JOHN BEVERLEY ROBINSON.

[THE offering of commissions, discounts, rebates and concessions of one kind or another to one's own customer or to an unemployed agent to induce him to bring in orders, is a perfectly legitimate means of securing business. To offer any inducements of this kind to an agent already in the employ of another person, as an architect is, is bribery, corruption and crime, as it tempts the agent so approached to commit a crime punishable at law. In spite of our correspondent's assertion, we do not believe that corruption of this kind is spreading or cannot be checked whenever it shows itself. Our reason for this belief is, that several times, when indignant architects have sent us business circulars offering commissions to them, but *professing no desire that the offer should be held "confidential,"* we have felt that the offer was made in the same spirit that it might be made to the customer himself, and in that belief have written to the party issuing the circular, explaining the delicate relationship in which an architect is placed as the fiduciary agent of his employer. In every case we have received answer that the offerers of commissions had not understood what an architect's relation to his client was, and an assurance that they would never send out similar circulars. If the offering of bribes must increase, it can only do so by the sufferance of the profession, and we have too high a regard for its members to believe that they are not both able and willing to check it. — EDS. AMERICAN ARCHITECT.]

THE RESPONSIBILITY FOR DILATORY WORK.

NEW YORK, April 22, 1886.

TO THE EDITORS OF THE AMERICAN ARCHITECT:—

Dear Sirs, — I have seen several answers in your paper to inquirers regarding the relations of architect and client, and as we look upon you as much as any one as an authority in these matters, I write to ask regarding a position which has lately arisen in my practice. Please let me know, in as sharply-defined lines as possible, what is the responsibility of a superintendent architect in the work of effectually hastening the progress of slow, dilatory contractors. In ordinary practice, ought he to be held accountable when the carpenter's work does not promptly meet the mason's, or *vice versa*, or when any other craftsmen are not in season for the steady progress of the building, it being pre-supposed that all contracts have been placed in proper and due season? I am superintending a work that has been unusually long in coming to a close — my client expresses a high degree of satisfaction with the purely architectural part of my service, but holds that I have been to blame that the work has been slow. The charge, as I understand it, is not of delay in giving drawings, but that I did not, with sufficient activity, use the whip with all hands, or, more properly, use language to that effect. How far, in my own opinion, I have failed in the "language part," I will not now say, except that I tried to do my best to expedite the work.

Granting that I was not successful, and that I have stood to my post for an extended period of supervision, how far have I failed in my professional duty? Yours truly, A Subscriber.

[It would be impossible to say, without knowing all the circumstances, whether "Subscriber" is to blame for the slow progress of the work. Perhaps he may have omitted to introduce any forfeiture for delay into his contracts, and the owner might justly complain of such an oversight, but, if nothing of this sort is to be imputed to him, he should not be saddled with the failure of the contractors to live up to their own agreements. Owners sometimes fancy that an architect ought to spend a good deal of time in prodding the contractors, forgetting that the architect can best serve them by a somewhat formal abstinence from interference with the contractors, except in the ways distinctly specified in the contract; and that officious directions, given without necessity in regard to matters not in the architect's province, may be construed, by a jury, always disposed to take a builder's part, as a waiver of the very provisions in the contract which the owner regards as most important. If "Subscriber" feels himself entirely blameless in the matter, and is sure that the delays were wholly due to the acts of the owner or the fault of the contractors, we will remind him that the profession considers him entitled to extra payment for the unexpected and unreasonable length of time through which he has been obliged to continue his service by superintendence. — Eds. American Architect.]

NOTES AND CLIPPINGS

What a Frenchman can do with a Hair. — Of General von Manteuffel, the late German military governor of conquered Alsace, who hated all that was French, it is said that he once, at a public dinner, engaged in a dispute with a French diplomat, who maintained the superiority of the French workmen over the artisans of all other nations. "A thing so ugly does not exist that the skill and genius of a Frenchman cannot make of it a thing of beauty," he said. Angered by the contradiction, the old soldier pulled a hair from his bristly-gray moustache, and, handing it to the Frenchman, said, curtly, "Let him make a thing of beauty out of that, then, and prove your claim." The Frenchman took the hair and sent it in a letter to a well-known Parisian jeweller, with a statement of the case and an appeal to his patriotic pride, giving him no limit of expense in executing the order. A week later the mail from Paris brought a neat little box for the General. In it was a handsome scarf-pin made like a Prussian eagle, that held in its talons a stiff gray bristle, from either end of which dangled a tiny golden ball. One was inscribed "Alsace," the other "Lorraine," and on the eagle's perch were the words, "You hold them, but by a hair." — *Exchange.*

The Fall of the Pemberton Mill. — The fire which has destroyed the picker-room and dye-house of the Pemberton Mills, in Lawrence, brings to mind the awful calamity of twenty-six years ago, when the main building of the Pemberton Mills collapsed, burying the 600 operatives in the ruins. It was about 4.30 o'clock, on the afternoon of January 10, 1860, that, without the slightest note of warning, the ceiling of the upper floor separated from the walls on either side, and in another instant carried each floor, with burdens of machinery, iron and timbers, to the bottom, where, with 600 people, a pyramid was formed, rising over 50 feet. The wall, thus freed from the internal support, wavered a moment, and, falling inward and outward, completed the wreck. The moans and cries for help of those in the ruins whose lives had not been immediately crushed out, mingled with an alarm rung out by the factory bells, called almost the entire community to the spot. Darkness lent additional horror to the scene, for, while a thousand hands were ready to rescue, it was impossible to know whence the calls for assistance came. Notwithstanding the difficulties surrounding the work, over 200 of the imprisoned were taken out in safety, beams and iron-pillars being moved about with the assistance of ropes. Communication with those of them who were uninjured was maintained for hours, and water, coffee and words of encouragement given them. Toward ten o'clock two men descended through a crevice with lanterns to rescue a young woman, when one of the lamps was broken. The burning oil set fire to the surrounding cotton, and in a few minutes the black, shapeless mass of débris was wrapped in flames. Before midnight every voice within the ruins was stilled in death. A few days after, a rough estimate of the loss of life was made, when it was found that 145 had been either crushed or burned to death, while 166 were wounded. Those of the dead who were not identified were carried to the City Hall, and there spread along the floor to await the recognition of friends, which in many cases was difficult and sometimes impossible. — *Boston Journal, April 12th.*

TRADE SURVEYS

There is just sufficient idle labor in the United States to protect employing interests from unreasonable demands of labor organized or unorganized. Each week absorbs some of this surplus, leaving the wage-workers more and more the masters of the situation. Good reasons exist for saying that the transition on Monday from ten hours to eight and nine hours labor per day will be quiet, orderly and satisfactory. At frequent periods within ten or fifteen years violent fluctuations have occurred in prices of products without any lasting disadvantage. The industrial transition which will take place on a more or less extended scale on Monday, is not regarded with as much quietude by the manufacturing interests at large, as the outside and disinterested observer. The employing interests are face to face with a new master; they are obliged to agree to many things which in the past they have refused to recognize. This week two hundred labor-organizers are initiating laborers at the rate of 10,000 to 15,000 per day. Their employers have at last aroused. Reference has been made heretofore to the movement of some manufacturers in Rhode Island and Massachusetts looking to organization. The preliminary work has been completed in those States and in other States, both in New England and in the Middle States. A spirit of organization is at work among the ranks of employers. No less than twenty organizations have been established for mutual protection and assistance. These organizations lack the elements of strength possessed by the labor unions, but they will answer for the emergency. The actuating motive at present is to guard their membership against undue advances in wages and against the exercise of undue control by the workmen over their employers and their business. These organizations of employers will shortly broaden in their scope: the history of trades-unionism on this side and on the other justify the statement. The iron and steel manufacturers in western Pennsylvania organized over twenty years ago for this same narrow, but commendable purpose of protecting their interests against the seemingly exorbitant demand of mill labor. The workmen's union was a compact one, and they were exceptionally fortunate in their struggles for higher wages, gaining nearly every strike which they made from that time to this. The result after a few years was the broadening of the employers' association, the development of a spirit of friendliness to their employés' union and the establishment of rules and regulations and a sliding-scale of wages, based upon the card-rates of iron for their future control. Many strikes have been avoided of late years because of this association among employers. When either side is dissatisfied, the rules provide for the calling of a conference of committees representing each side where complaints are discussed and friendly results arrived at. This organization of workmen grew from a small local association of less than one hundred men into one compact organization known as the Amalgamated Association of Iron and Steel Workers, and numbers between 20,000 and 30,000 skilled laborers in the nearly three hundred rolling-mills in the United States. The employers' association has also expanded into a national federation of iron and steel manufacturers, and strikes or lockouts are not thought of by either side. The interest of iron and steel mill-employés and of their employers in Great Britain are kept in harmony by some such system as this. Up to 1866 bitter and prolonged strikes occasioned sore distress on one side and serious losses on the other. Out of this grew the Board of Conciliation and Arbitration for the manufactured-iron trade of the North of England. For several years there have been no serious strikes in the region controlled by this organization. Arbitration is accepted, though not without deep complaints on one side or the other at times. In the United States the organization of labor will expand with such rapidity during the next year or two that employers will be obliged to band together at first for protection against exhorbitant demands, but ultimately for the purpose of establishing friendly relations with their workmen through their labor associations. Out of this will flow many good results; employers who have for all time been accustomed to absolute independence will not gently take to this labor control, but it is a power which will force itself into recognition. It is making no prediction to say that in a few years the larger industries will be compactly organized, and that all disputes will be settled in a friendly way by Boards of Arbitration or Conciliation, and furthermore that the profit-sharing system will gain in acceptance and will be found to produce results that will make it a welcome escape from chronic evils. Half of the difficulties in this whole question will disappear as soon as organized labor demonstrates its ability to equalize the rates of wages throughout the United States in each industry. The fear now entertained is that organization will control in isolated sections, and that the uncontrolled industrial interests will possess special advantages in consequence. Particular attention is devoted to this over-written-about question at this time, because of the universal interest felt in it on account of the impending change in the hours of labor. There are, no doubt, thousands of employers whose experience justifies them in predicting evil results, and who cannot be induced to see their way smoothly through the changes at our doors. The question is a broad one, and no one can see to the end of it. The causes at work are legitimate ones; the objective point of the army of wage-workers is an honorable one, therefore no harm can come from the movement. If the reform is not general it will fail of its own weight. There is good reason, however, for believing that in the building trades and in the bulk of the industries in the larger cities and towns the reduction will be general and permanent, and that in a few weeks confidence will be restored, that demand for all sorts of products and material will increase, and that the summer and autumn will be seasons of exceptional industrial and commercial activity. The strike fever will surely subside. The iron trade has lost some of its vigor during the past few days, so far as market indications go to show. The production, however, of both iron and steel have not been curtailed, and there are no evidences of any falling off in consumption. Railroad building this year, to date, foots up five hundred and fifty miles as against three hundred and fifteen miles same time last year. The commercial failures up to a week ago for this year were 3,814 as against 4,479 same time last year. Railroad traffic is increasing on the Trunk lines, and in some directions earnings are also improving. Moderate gains in the movement of general merchandise are reported at several Western commercial centres. The bituminous miners of Pennsylvania and Maryland are on strike to the number of about 25,000, and in the anthracite regions the apprehension is to-day that a general strike will be inaugurated for the eight-hour day, and for the correction of a number of abuses that have existed a long time. The newspapers are doing more to stimulate strikes by their sensational reports than the labor agitators themselves. All that the anthracite miners want is the eight-hour day at present. An extremely small volume of business has been transacted in the stock markets. The money-markets are quiet, business-paper discounts ruling at four and one-half to five per cent. There is no marked activity in financial circles anywhere, but an improving demand for money is likely to be developed in the West. The probabilities point to an improving trafic and improving freight rates. Returns on the Trunk lines are more satisfactory this year at twenty-five cents than last year at fifteen. An extensive movement is in progress in lumbering operations in both primary and secondary markets. Textile manufacturers are gradually restricting their operations.

The Paintings in the Pantheon, Paris, deteriorating. — An unforeseen trouble has arisen in consequence of the secularization of the Panthéon, in Paris. The splendid frescos which have occupied the leading artists of France nearly ten years, are already showing signs of injury from damp. So long as regular services were held in the Panthéon the constant influx of fresh air and the warmth generated by the congregations kept the interior tolerably dry. Now these influences are withdrawn, steps must be taken to preserve the frescos. Unfortunately, there are no existing means of warming the building, so that it will be necessary to erect stoves if the works of Puvis de Chavannes, Cabanel, Laurens, H. Levy and others are to be preserved. — *New York Tribune.*

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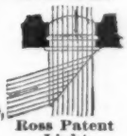

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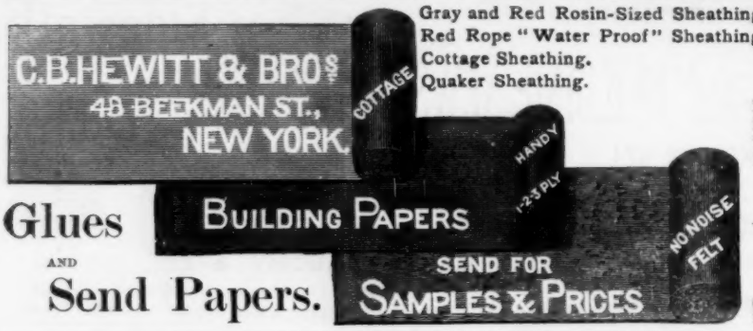

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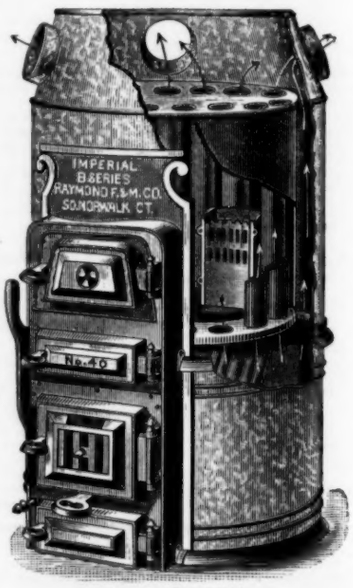

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NEW ENGLAND FAMILY RANGES,

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340,484. Box for Washing Material for Concrete.—Thos. W. Carrico, San Antonio, Tex.

340,485. Method of Imitating Stained-Glass.—Alberta M. F. Caspar, London, England.

BUILDING INTELLIGENCE.

Reported for the American Architect and Building News.

ALTERATIONS.

Camden, N. J.—Messrs. Carr & Smith are to build a second-st'y addition to be used for office purposes.

Minneapolis, Minn. — P. A. Lee, addition, 828 Nicollet Ave.; cost, $3.000.

APARTMENT-HOUSES.

New York, N. Y.—*One Hundred and Nineteenth St.*, s w cor. Second Ave., 6 five-st'y brick flats, tin roofs; cost, $100,000; owners, Mary C. Hoffman and Francis W. Ford, 232 East One Hundred and Twenty-fourth St. and Damarest, Bergen Co., N. J.; architects, Cleverdon & Putzell, 110 East One Hundred and Twenty-fifth St.

West Forty-sixth St., No. 412, five-st'y and basement brick flat, tin roof; cost, $16,000; owner, Catharine Bowman, 44 Ward St., Patterson, N. J.; architects, Jordan & Geller, 19 Park Place.

Eldridge St., No. 47, five-st'y brick flat, tin roof; cost, $19,000; owners, Baum & Friedman, 101 Nassau St.; architects, Herter Bros., 191 Broadway.

One Hundred and Twenty-ninth St., s s, 125′ w Eighth Ave., five-st'y brick flat, tin roof; cost, $69,-000; owner, Christina R. Kehoe, 57 East One Hundred and Twenty-first St.; architect, Alfred Kehoe, 57 East One Hundred and Twenty-first St.

Avenue A, w s, from Seventy-eighth to Seventy-ninth St., 9 five-st'y brick flats, tin roofs: cost, $150,-000; owner, Francis J. Schnugg, 433 East Eighty-sixth St.; architects, Herter Bros., 314 East Forty-third St.

Orchard St., w s, 128′ s Stanton St., 2 five-st'y brick flats, flat tin roofs; cost, $44,000; owner, A. C. Zabriski, 12 East Thirtieth St.; architect, James E. Ware, 239 Broadway.

Tenth Ave., n e cor. Seventy-ninth St.; *Tenth Ave.*, s e cor. Seventy-ninth St., 2 five-st'y brick flats; cost, $60,000; owner, Augustus Merritt, 307 Monroe St., Brooklyn, N. Y.; architects, Thom & Wilson, 1267 Broadway.

One Hundred and First St., n s, 100′ w Second Ave., 4 four-st'y brick flats, flat tin roofs; cost, $60,-000; owner, Martin Kenney, 1803 Third Ave.; architect, John C. Burne, Parepa Hall, cor. Third Ave. and Eighth Ave.

Ninth Ave., e s, 25′ 5″ s Fifty-first St., four-st'y brick flat, flat tin roof; cost, $16,000; owner, Matilda Lehman, 754 Ninth Ave.; architects, Thom & Wilson, 1267 Broadway.

West Thirty-second St., Nos. 225 *and* 227, five-st'y brick flats, tin roofs; cost, $37,500; owner, Thomas Morgan, 1155 Broadway; architect, C. E. Angell, 137 Broadway.

Third Ave., n w cor. Sixty-seventh St., five-st'y brick flat, flat tin roof; cost, $30,000; owner, Jacob Ruppert, s e cor. Fifth Ave. and Ninety-third St.; architect, Julius Kastner, 744 Broadway.

BOOK NOTES.

WALTER LEWIN says, in the last *Academy* (London), at the end of a five-column review of the "Longfellow Biography": "I close this biography with gratitude to its writer for the excellence of his work. With this clear and pleasing picture of the poet in our minds, my pleasure in his verses will henceforth be indefinitely greater even than before."

Petermann's Mitteilungen, published at Gotha, Germany, is the leading geographical periodical in the world In its February number it reviews Percival Lowell's "Chosön; The Land of the Morning Calm: "The author tells what he saw with much humor and skill, painting the scenes in an attractive manner. What he says about the condition of women, superstition and mathematical knowledge is worth reading. The Albert-types are highly commendable."

"ARTISTIC HOMES" is thus commended by *Building*: "It has in many cases proved a very valuable assistant, a faithful friend and reliable adviser, to persons of refined taste and artful feeling who contemplated building a home. . . . We heartily commend it to all who intend building a home. To the architectural student and draughtsman the book should prove a valuable aid in teaching him how to effectively draw perspectives or interior views."

THE *Northwestern* reports Ballou's "Edge-Tools of Speech" to be "an almost inexhaustible mine of the choicest thoughts of the best writers of all ages and countries, from Confucius down to Garfield and Gladstone — a *potpourri* of all the spiciest ingredients of literature. There is a vacancy on every student's desk, and in every library, which it alone can fill, and, we believe, soon will fill. The book deserves the popularity which it is almost certain to gain."

THE *Atlantic Monthly*, reviewing Percival Lowell's "Chosön," says: "At the very beginning of his narrative one notices that something besides the land and the people is unusual, namely, the narrator himself; and as one reads on, he discovers in his author a rare combination of properties, a threefold strain, poetic, scientific and human, running at the will of an exceptionally active intelligence. An atmosphere is first diffused over the plains and mountains, and what in literary criticism is called its sentiment is given at once quite simply and effectively. A desolate, sad and lonely land it was, and yet with the color which invests oriental things like a spell."

THE Providence *Journal* gives a review of over three columns to Samuel Longfellow's biography of Henry Wadsworth Longfellow, in the course of which it says: "We have made few extracts from this fascinating biography, simply because the embarrassment of riches was so great. On the Easter Day after his burial, Phillips Brooks said, in words which we quote from memory: 'Of all poets, Longfellow will ever be remembered as the one whose personal life and character gave the brightest and finest of pictures in the eyes of his contemporaries, as the one who in the best way has the reality of life about himself, and sang of immortality as he sang of home. It is impossible to say too much in praise of the manner in which the biography is compiled."

THE *Keynote* says, of Isaac Henderson's intense romance of Italy: "'The Prelate' is one of the most brilliant and fascinating novels of the day — dramatic and powerful, full of thought and rapid in action, and Rome is the picturesque background for it all."

"'THE Prelate' is worthy of high commendations. Here the insight into character, the delicacy and fineness of touch, the keenness of analysis, and the firmness of the literary method, reminds one at times of Mr. Henry James, but are unaccompanied by what the latter's least ardent admirers are wont to call prolixity." — *Christian Union.*

THE *Beacon* commends thus George Willis Cooke's "Poets and Problems: Tennyson, Browning, Ruskin": "Mr. Cooke has given us a helpful, clean and wholesome book, and it will give real aid to the beginner in the highest walks of modern English literature. And Mr. Cooke should be thanked for the simplicity and reverence with which he writes."

THE Rev. Orlando Witherspoon, of Birmingham, Conn., who died last week, was a faithful and hardworking Episcopal minister, famous for his exquisite carols and other church-music, and also as the author of "Doctor Ben," one of the best novels of the famous Round-Robin Series. Some of the Irish characterizations in this most interesting story are equal to anything in the pages of Charles Lever.

THE *Montreal Gazette* gives up a column and a half for a review of Percival Lowell's noble new book about Korea: "His pictures, reproduced with admirable skill and taste, greatly enhance the value of the work. We seem to have Korea and the Coreans, town and country, natural features and architecture, dress and manners, palace and shop, noble and peasant before our eyes, while, from our vantage ground, whatever strikes us as peculiarly strange is promptly relieved of all mystery by the courteous and enlightened *cicerone* who accompanies us."

BUILDING INTELLIGENCE.

Tenth Ave., n e cor. Seventy-sixth St., five-st'y brick flat, tin roof; cost, $25,000; owner, Robert Morrison, 152 West Fifty-third St.; architect, M. V. B. Ferdon, 16 Morton St.

CHURCHES.

Little Rock, Ark. — The congregation of the Christian Church are going to tear down their old building which is one of the oldest in the town, and rebuild on the same site.

Newton, Pa. — Presbyterian Sunday-school and lecture-room, to be built of brown-stone, 45′ x 70′, one-st'y high; Mr. Charles W. Bolton, architect.

New York, N. Y. — *Fifty-fifth St.*, n w cor. First Ave., superstructure of Church of St. John the Evangelist, slate roof; cost, $90,000; rep. owner, Rev. James Flood, Fifty-fifth St., near First Ave.; architect, Arthur Crooks, 28 West Twenty-third St.

Riverton, N. J. — Baptist Church, 40′ x 50′, brick and stone, hard-wood finish; Mr. Charles W. Bolton, architect.

FACTORIES.

Ashburnham Centre, Mass. — It is reported that a New York knitting-machine company has negotiated for a factory site below Ashburnham Centre, on the road to Fitchburg.

Boston, Mass. — *East Eighth St., No.* 369, mechanical, 14′ x 24′; owner, James Flavin; builder, H. T. Hutchinson.

Camden, N. J. — A brick foundry, 60′ x 140′, is to be built by Johnson & Holt, at Delaware Ave. and Elm St.

The Wood Manufacturing Company of Camden will build a factory, 53′ x 150′.

Cooperstown, N. Y. — A soap factory is building for Capt. Cooper.

Foxboro, Mass. — An association has been formed in Foxboro, including Mr. Edwin B. Rogers, of Beverly, as the man of experience, to engage in the manufacture of boots and shoes. A four-st'y building, 40′ x 100′, will at once be erected near the Old Colony station in that town, in which to carry on the business.

Mt. Holly, N. J. — The Board of Trade is about to erect a building, at a cost of $5,000, for a Philadelphia manufacturer who has promised to move his plant to Mount Holly.

North Shelburne, Mass. — Alton Newton is to build a store-house for grain here.

BUILDING INTELLIGENCE.

Pittsburgh, Pa. — One of the largest shoe factories in the country is to be built here by W. E. Schmertz.

Providence, R. I. — *Back St.*, w s, addition to brick mill; cost, $4,900; owner, Fletcher Manufacturing Co.; builders, N. B. Horton and D. Glover.

South Paris, Me. — Sufficient aid has been subscribed to insure the rebuilding of the factory of the Paris Manufacturing Company.

Westfield, Mass. — The Atlantic Cigar Company is building a three-st'y building.

HOUSES.

Boston, Mass. — *Armandine St.*, near Milton Ave., dwell., 25′ x 44′; owner, Harold Weston; builder, J. W. Sinclair.

Child St., near Call St., dwell., 23′ x 47′; owner, Thomas Glennon; builder, Joseph Cahill.

Eliot St., cor. Hagar St., dwell., 15′ x 45′; owner, G. H. Desjardins; builder, A. A. Ayers.

Howard Ave., opp. Sargent St., dwell., 21′ x 56′; owner and builder, A. P. Clifford.

Armandine St., near Milton Ave., dwell., 28′ x 29′; owner, W. J. Fox; builder, E. F. Moulton.

Bambridge St., No. 43, dwell., 22′ x 54′ 8″; owner, T. M. Watson; builder, R. O. Dunn.

Hyde Park Ave., near Richardson St., dwell., 20′ x 48′; owner, C. P. Allen; builder, R. W. Stevens.

Parsons St., near Arlington St., dwell., 29′ 6″ x 30′; owner and builder, Pierce Quirk.

East Third St., No. 527, dwell., 23′ x 32′; owner, J. J. Dorgan; builder, J. A. Hasty.

Brooklyn, N. Y. — *Putnam Ave.*, s s, 76′ w Throop Ave., 5 two-st'y brown-stone dwells., tin roofs; cost, each, $7,000; owner, Jno. Saddington, 462 Willoughby Ave.; architect, F. D. Vrooman.

Bushwick Ave., e s, 30′ s Vanderveer St., 3 two-st'y frame buildings, gravel roofs; cost, each, $2,500; owner, G. S. Shelton, 193 Quincy St.; architect and builder, A. Wilkinson.

St. Mark's Pl., 3 on the s s, and 3 on n s Warren St., 451 w Fifth Ave., three-st'y brick dwells., gravel roofs; cost, each, $5,500; owner and mason, Chas. H. Collins, 359 Sixth Ave.; architect, J. G. Glover.

Lincoln Pl., s s, 190′ w Eighth Ave., 3 three-st'y brown-stone dwells., metal roofs; cost, each, $11,000; owner, architect and contractor, William Flanigan, 46 Berkeley Pl.; mason, Jno. Sharack.

Louis Pl., w s, 98′ s Herkimer St., 3 two-st'y brick dwells., tin roofs; cost, each, $3,600; owner, Franz Schmidt, East New York; architect, K. I. Peters; mason, M. J. Reynolds.

Seventh Ave., s e cor. Garfield Pl., 3 three-st'y brown-stone dwells., tin roofs; total cost, $30,000; owners, architects and builders, Martin & Lee, 440 Clermont Ave.

Walcott St., n s, 25′ e Richard St., two-st'y frame dwell., tin roof; cost, $2,450; owner, M. Warty, on premises; masons, M. Gibbons & Son.

Garfield Pl., No. 40, s s, 283′ w Fifth Ave., two-st'y brick dwell., tin roof; cost, $3,800; owner, architect and builder, T. J. Nash, 42 Garfield Pl.

Halsey St., s on s s, and 3 on n s, 250′ e Stuyvesant Ave., two-st'y brown-stone dwells., tin roofs; cost, each, $4,800; owners and builders, Lambert & Mason, 148 Putnam Ave.; architect, I. D. Reynolds.

Hicks St., e s, 250′ s Joralemon St., four-st'y brown-stone flat, gravel roof; cost, $25,000; owner, G. Reusens, Wells Building, New York; architect, W. M. Coots; builder, H. D. Southard.

Union St., n s, 80′ e Fifth Ave., 3 four-st'y brown-stone flats, tin roofs; cost, each, $9,750; owner, William Irvine, 395 Ninth St.; architect, Jno. C. Burne, New York; masons, Buchanan & Reilly; contractor, W. J. Conway.

Eighth Ave., w s, 20′ s Berkeley Pl., 4 three-st'y brown-stone dwells., tin roofs; cost, each, $13,000; owner, Wm. Gubbins, 27 Seventh Ave.; architect, C. Werner.

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ROLLING VENETIAN BLINDS

Roll from above or below, (Any kind of wood). Handsomely finished.

WILSON'S "ENGLISH"
VENETIAN BLINDS.
to pull up with cord. (See cut.)

WILSON'S ROLLING
STEEL SHUTTERS.
Fire and Burglar Proof.

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We claim for this rail all of the following advantages:

It is level with the floor, offering no obstruction in walking, dancing, moving of furniture, etc.

The door cannot get off the track, and runs lightly, smoothly, and noiselessly.

The house does not have to be built for the track, it can be laid in old houses as well as in new.

Full directions for laying them sent with each Track.

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DEADENER OF SOUND.

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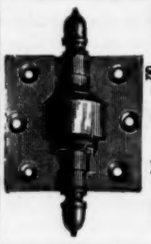

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They work either way, right or left. All sizes. Single or double acting.

For Wire Screens or Light Doors they have no equal.

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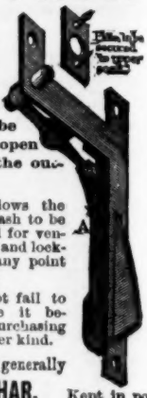
This new device is a perfectly secure lock for the window which cannot possibly be forced open from the outside.

Lock applied.



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Used by Architects and Builders, for glazing, weather stripping, wash-boards, etc. A close joint, water, dust, insect and mouse proof.

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BUILDING INTELLIGENCE.

Eighth Ave., s e cor. Berkeley Pl., three-st'y brown-stone dwell., tin roof; cost, $16,000; owner, etc., same as last.

Dean St., n s, 300′ e Franklin Ave., 6 three-st'y stone and terra-cotta dwells., mansard, tin and slate roofs; total cost, $45,000; owner, Geo. H. Cook, Dean St., near Bedford Ave.; architect, H. P. Fowler, New York; builder, W. J. Conway.

Central Pl., w s, 100′ s Greene Ave., 4 three-st'y frame (brick-filled) dwells., tin roofs; cost, each, $2,500; owner and builder, Geo. Jackson, 38 Elm St.; architect, H. Vollweiler.

Benezet Sta., Pa.—S. M. Gilbert is building a house here, of stone and tile, with hardwood finish; cost, about $20,000; Messrs. Hazelhurst & Huckle, architects.

Camden, N. J. — Messrs. Moses & King are the architects of four brick dwells., on Jackson St., above Seventh St.; cost, $3,500; for Mrs. Helen Wingate.

Messrs. Hazelhurst & Huckel are the architects of a house on Cooper St., stone front, hard-wood finish, 26′ x 68′; owner, Mr. Nevins.

Clifton, Pa. — Mr. Chas. W. Bolton is the architect of a brick and frame house here, for Messrs. Adams & Baker, agents; it is 30′ 6″ x 39′, and is to cost about $7,000.

Easton, Pa. — Messrs. Hazelhurst & Huckel, have plans prepared for a house on College Hill, for Mr. S. L. Fisler. It is built of stone and timber.

Minneapolis, Minn. — F. McMichael, dwell., 422 Ridgewood Ave.; cost, $4,700.

T. N. Kelly, dwell., 243 Garfield Ave.; cost, $3,000.

New York, N. Y. — *Eighty-third St.*, n s, 100′ w West End Ave., 4 three-st'y brick dwells., tin roofs; cost, $25,500; owner, James Slattery, 620 West Eighty-fourth St.; architect, I. B. Terhune, 229 West Thirty-sixth St.

One Hundred and Thirty-second St., s s, 375′ e Eighth Ave., 3 three-st'y brick dwells., tin roofs; cost, $45,000; owner, Chas. Van Tassel, 215 East One Hundred and Twenty-second St.; architect, Chas. Baxter, 112 East One Hundred and Twenty-fifth St.

Washington Ave., w s, 214′ s One Hundred and Sixty-ninth St., three-st'y brick dwell., tin roof; cost, $20,000; owner, Philip Ebling, n e cor. One Hundred and Fifty-sixth St. and St. Ann's Ave.; architects, A. Pfund & Son, 232 West Thirty-sixth St.

Philadelphia, Pa.—*Aspen St.*, cor. Forty-second St., 2 three-st'y dwells. and stores, 16′ and 18′ x 70′; cost, about $8,000; owner, Wm. Trautwine; architect, T. C. Worthington.

Forty-second St., below Aspen St., three-st'y dwell.; cost, $4,500; owner and architect, same as last.

Twelfth St., cor, Spruce St., four-st'y brown-stone and brick dwell., 26′ x 70′; cost, about $15,000; owner, Dr. Knerr; architects, Messrs. Hazelhurst & Huckel.

Providence, R. I.—*Almy St.*, e s, frame dwell.; cost, $6,500; owner, J. Colwell; builder, H. Evans.

Public St., n s, frame dwell.; cost, $3,300; owner, J. H. Brophey; builder, J. H. Canning.

Bowen St., s w cor. Brook St., frame dwell.; owner, Cora E. Lithgow; architects, Gould & Angell; builders, Gammons & Grant.

Angell St., s s, frame dwell.; owner, Mrs. G. S. A. Gardner; architects, Stone, Carpenter & Willson; builder, Thos. Barry.

Admiral St., s e cor. Veto St., frame dwell.; cost, $2,200; owner, T. Rooney; builder, John Bucklin.

Whitmarsh St., s s, frame dwell.; owner, F. B. Lawton; architect, F. E. Field; builder, C. Sanford.

Seabright, N. J. — For Mr. J. Harper Bonnell, a $10,000 house is to be built from plans of Mr. W. H. Smith of New York.

PUBLIC BUILDINGS.

Little Rock, Ark. — The State is about to erect a building for the purpose of an armory, etc.

SCHOOL-HOUSES.

New York, N. Y. —*West Fiftieth St.*, 400′ w Ninth Ave., four-st'y brick school building, tin roof; cost, $110,000; owner, City of New York (Board of Education); architect, D. J. Stagg, 146 Grand St.

West Chester, Pa —Mr. T. Roney Williamson, of Philadelphia, Pa., is the architect of the public school which will be built here. The building is to be of pressed-brick, with stone belt-courses, 70′ x 140. At each end there are pavilions with copper gables. The heating and ventilation will be by the Ruttan system. All the interior partitions are to be of brick.

STORES.

Bridgeton, N. J.—Messrs. Hazelhurst & Huckel are the architects of the Cumberland National Bank, which is to be built on the cor. of Commerce and Coral Sts.; of brick and stone.

Brooklyn, N. Y.—*Fifth Ave.*, e s, 87′ 6″ s Lincoln Pl., 3 four-st'y brown-stone double stores and flats, tin roofs; cost, each, $11,000; owners, architects and builders, Assip & Buckley, 77 Waverly Ave.

Fifth Ave., e s, 26′ s Lincoln Pl., 3 four-st'y brown-stone stores and flats, tin roofs; cost, each, $9,000; owners, architects and builders, same as above.

Little Rock, Ark. — A. L. Wassell has commenced work on two brick stores between Sixth and Seventh St., on Main St., 40′ x 72′; cost, about $3,600.

S. L. Griffith is to build a store, 25′ x 84′, on Main St., between Seventh and Eighth Sts.; estimated cost, $3,000.

Wm. D. McGann has commenced work on his new stores on Markham St., between Louisiana and Creston.

Minneapolis, Minn. — Gates Bros., basement to hotel-building, cor. Eighth and Hennepin Ave.; cost, $32,000.

Dreukel Bros., two-st'y frame store, 2901 and 2903 North Eighth Ave.; cost, $3,000.

TENEMENT-HOUSES.

Brooklyn, N. Y.—*McDougal St.*, e s, 100′ e Howard Ave., 3 three-st'y frame (brick-filled) tenements, tin roofs; cost, each, $4,500; owner and contractor, J. W. Stewart, Quincy St., near Tompkins Ave.; architects, Platte & Acker.

Rutledge St., s s, 326′ w Harrison Ave., 3 three-st'y brick tenements, tin roofs; cost, each, $7,000; owner, John Auer, Rutledge St., near Harrison Ave.; architects, Platte & Acker.

Warren St., No. 499, four-st'y brick tenement, tin roof; cost, $4,500; owner, Jas. McGarry, 491 Warren St.; architect, Robert Dixon; builder, John Gallagher.

Henry St., e s, 44′ n Luquer St., 2 three-st'y brick tenements, tin roofs; cost, each, $4,000; owner, R. E. Topping, 369 Franklin Ave.; architect and contractor, M. H. Hawkins.

Graham Ave., n e cor. Ten Eyck St., 2 three-st'y frame (brick-filled) tenements, tin roofs; total cost, about $7,000; owner and architect, same as above.

Clermont Ave., No. 141, w s, three-st'y brick tenement, tin roof; cost, $6,300; owner, Martin Brennan, on premises; architects and builders, Assip & Buckley;

Sixth Ave., No. 50, 60′ from Bergen St., four-st'y brick tenement, tin roof; cost, $9,000; owner, Jacob Steiner, 475 Bergen St.; architect, Wm. P. Bannester, New York; mason, Thomas B. Rutan; contractor, Wm. G. Lee.

Fifth Ave., w s, 45′ s Butler St., 2 four-st'y brick apartment-houses, tin roofs; total cost, $16,000; owners, McLaughlin & McConnell, cor. Columbia and Warren Sts.; architect, W. M. Coots; mason, Jno. Donahue.

Minneapolis, Minn.—Hughlin & Mane, block, 614 to 626 Ninth St., s; cost, $53,000.

New York, N. Y.—*Grand St., No.* 343, three-st'y brick tenement, tin roof; cost, $10,000; owner, Catharine L. Wolf, 3 Mercer St.; architect, John B. Snook, 12 Chambers St.

Fifty-ninth St., s s, 325′ e Ninth Ave.; 2 five-st'y brick tenements, tin roof; cost, $22,000; owner, Jas. Netter, 116 West Sixty-seventh St.; architects, A. B. Ogden & Son, 1031 Madison Ave.

Second Ave., w s, 256′ n Ninety-sixth St., 3 five-st'y brick tenements, flat tin roof; cost, $45,000; owner, Thomas Smith, 1704 First Ave.; architect, A. B. Ogden & Son, 1031 Madison Ave.

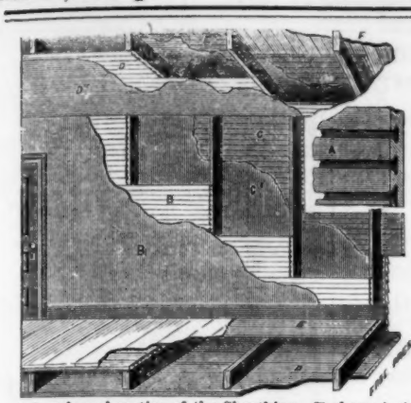
Ninth Ave., n e cor. Thirty-seventh St., five-st'y brick tenement, flat tin roof; cost, $30,000; owner, Joseph Stern, 55 West Fiftieth St.; architects, Thom & Wilson, 1267 Broadway.

Ninth Ave., e s, 24′ 9″ n Thirty-seventh St., five-st'y brick tenement, flat tin roof; cost, $20,000; owner: Joseph Stern, 55 West Fiftieth St.; architect, Thom & Wilson, 1267 Broadway.

Jane St., No. 82 and 82½, 2 five-st'y brick tenements; cost, $26,000: owner, John Totten, 250 West Forty-ninth St.; architect, M. Louis Ungrich, 1554 Broadway.

Division St., No. 166 and 168½, five-st'y brick tenement, flat tin roof; cost, $12,000; owner, Howard Cooklin, 27 East Tenth St.; architects, Renwick, Aspinwall & Russell, 71 Broadway.

Columbia St., No. 25 and 27, 2 five-st'y brick tenements, flat tin roofs; cost, $24,000; owner, Jacob Raichle, 227 William St,; architect, Julius Boekel & Son, 54 Broad St.



A is enlarged section of the Sheathing. B shows inside application to receive Plastering B. C is outside application for back-plastering C. D is application to receive plastering for Ceilings. E is EUREKA, used for Floor Linings for deadening Plaster.

EUREKA SHEATHING.

EUREKA SHEATHING has undercut grooves on one side, and is tongued and grooved, and may be plastered on one side.

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As an *Outside Sheathing* to receive rough Cast and Stucco on outside walls also to receive back plastering between the studding. On *Frame Hotels* and all *Frame* buildings of the better sort, its use in this way is very desirable, rendering them warm in winter and cool in summer.

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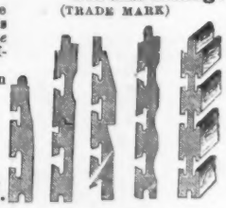

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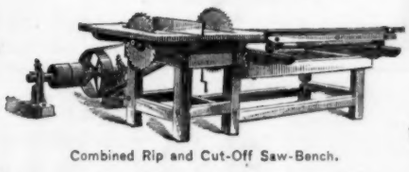

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CITY ENGINEER'S OFFICE, CITY HALL,

PROVIDENCE, R. I., March 12, 1886.

Abstract from letter of

SAMUEL M. GRAY, CITY ENGINEER.

During the season of 1885 the **Sewer Department** used **3,152 Barrels** of the **New York and Rosendale Cement.** Of this amount **1,348** barrels were tested for tensile strength, the average of the Season's tests being **165.7** pounds per square inch, twenty-four hours test.

One hundred and forty-five barrels were tested for fineness, the average amount passing through a **2,500** mesh sieve being **92.56** per cent.

Tests for checking were occasionally made but none were discovered.

BUILDING INTELLIGENCE.

Providence, R. I.—*Drew St.*, n corner Sherwood St., tenement; owner, A. T. Stewart; builder, J. Rafferty.

MISCELLANEOUS.

New York, N. Y. — *Forty-third St.*, n w cor. East River, one-st'y frame coal-shed, gravel roof; cost, $25,000; owners, Consumers' Coal Company, 145 East Forty-sixth St.; builder, Benj. D. Brown, Boston, Mass.

Twenty-eighth St., s s, about 100′ e First Ave., two and three st'y brick storage-building; cost, $10,000; owner, City of New York (Department Charities and Correction); architect, N. Le Brun, 24 Park Pl.

PROPOSALS.

COURT-HOUSE.
[At Northampton, Mass.]

NORTHAMPTON, MASS., April 27, 1886.

Sealed proposals for building a court-house in Northampton, Mass., will be received by the County Commissioners of Hampshire County, Mass., **until Thursday, May 13, 1886, at 12 o'clock,** M.

Proposals may be made for the outside walls, either of brick or rock-faced granite.

Plans and specifications for the work may be seen at the office of E. C. Davis, in Northampton, on and after Friday, April 30, 1886.

Tenders may be indorsed "Court-House Proposals," and filed with E. C. Davis, acting as agent for the County Commissioners.

The Commissioners reserve the right to reject any or all proposals that may be received.

E. A. EDWARDS,
ELNATHAN GRAVES,
FLAVEL GAYLORD,
} County Commissioners.

541*

CARPENTRY.
[At Springfield, Mass.]

SPRINGFIELD, MASS., April 23, 1886.

Plans and specifications can be seen, and proposals will be received, at the City Engineer's office, Bridge Street, **until 12** M., **on Wednesday, May 5,** for sheathing the ceiling and reflooring the City-Hall, and performing other work therein.

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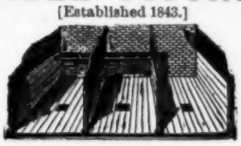

HAY RACKS, MANGERS, ETC., ETC.

Send for Prices and Catalogues.

SAMUEL S. BENT & SON,
111 Chambers St., New York.

PROPOSALS.

Proposals must be enclosed in sealed envelopes addressed to the Committee on City Property, and endorsed Proposals for Carpenterwork, City-Hall.

The right is reserved to reject any or all proposals.

Per order Committee on City Property.

J. F. BIDWELL,
Chairman.

540

FRESCOING AND PAINTING.
[At Springfield, Mass.]

SPRINGFIELD, MASS., April 23, 1886.

Plans and specifications can be seen and proposals will be received at the City Engineer's office, Bridge Street, **until 12** M., **on Wednesday, May 5,** for frescoing and painting the interior of the City-Hall.

Proposals must be enclosed in sealed envelopes addressed to the Committee on City Property and endorsed "Proposals for Painting City-Hall."

The right is reserved to reject any or all proposals.

Per order Committee on City Property.

J. F. BIDWELL,
Chairman.

540

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PROPOSALS.

PIG TIN, ETC.
[At Philadelphia, Pa.]

FRANKFORT ARSENAL,
PHILADELPHIA, PA., April 26, 1886.

Sealed proposals, in duplicate, will be received by the undersigned **until 1 o'clock,** P. M., **on Wednesday, May 26, 1886,** for supplying 10,000 pounds pig tin, "straits" or equal; five leather fly-nets, and various cultivating tools, etc.

Blank forms for proposals and all information desired may be had upon application at this office.

The Government reserves the right to reject any or all proposals or parts thereof.

S. CRISPIN,
Col. of Ordnance, Commanding.

543

COURT-HOUSE.
[At Stanton, Dak.]

STANTON, DAK., April 5, 1886.

Notice is hereby given that sealed bids will be received by the undersigned **up to Monday, July 5, 1886,** for the construction of a court-house in Stanton, Mercer County, Dak., said court-house to be of frame or brick veneered, 24′ x 40′, two-st'y high.

Plans and specifications may be seen at my office.

Iron-Work.

MESKER & BRO.,
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PROPOSALS.

All bids must be accompanied by good and sufficient bonds for half of the contract price.

The Board of County Commissioners reserves the right to reject any or all bids.

By order of the Board. A. H. MACRORIE,
544 County Clerk.

IRON LATHING. [At Washington, D. C.]

Office of Building for State, War and Navy Departments, Washington, D. C., April 29, 1886.

Sealed proposals for furnishing, delivering and putting in place the lathing and lathed-iron partitions, using corrugated or flat sheet iron laths, in the West and Centre wings of the Building for State War and Navy Departments, in this city, will be received at this office **until 12 M., on Wednesday, the 12th day of May, 1886**, and opened immediately thereafter in presence of bidders.

Specifications, general instructions to bidders, and blank forms of proposal will be furnished to parties regularly engaged in the above class of construction, on application to this office.

THOS. LINCOLN CASEY, Col. Corps of Eng'rs.
541*

CHAMBER OF COMMERCE. [At Cincinnati, O.]

Sealed bids will be received by the Board of Real Estate Managers of the Chamber of Commerce, of Cincinnati, O., **until May 17, 1886, at 12 o'clock, noon**, for the construction of the new Chamber of Commerce Building.

Plans and specifications can be seen and information obtained at the office of the superintendent in the old post-office building, cor. Fourth and Vine Sts., Cincinnati, O.

Separate bids will be received for the various branches of work; also lump bids for the whole.

Bids must be made on blank forms furnished by the Board.

Parties desiring information will address George S. Bradbury, Secretary.

The Board reserves the right to reject any or all bids. EDWIN STEVENS,
541* President.

STORE-HOUSE. [At Port Royal, S. C.]

Navy Department, Bureau of Yards and Docks, Washington, D. C., April 14, 1886.

Sealed proposals, in duplicate, endorsed "Proposals for Naval Store-house," and addressed to the Chief of Bureau of Yards and Docks, Navy Department, will be received **until 12 o'clock, M., May 14, 1886**, at which time and place the proposals will be opened in the presence of bidders for the construction of a store-house at the Naval Station, Port Royal (Paris Island), South Carolina, including all labor and materials, in accordance with the plans and specifications for the same on file in this bureau, and at the office of the officer commanding said station, where all information and blank forms for making proposals may be obtained.

Proposals will be received only from contractors who are able to furnish without delay all the materials and labor required for the active prosecution of the work; they will state in their proposals date of commencement and number of days to complete the store-house.

No proposals will be considered which shall be received after the period named in the advertisement, and no allowance will be made for failure of the mails.

Bond in double the amount of the contract, if proposal is accepted, will be required for the faithful fulfilment of the offer made.

The right is expressly reserved to reject and all bids not considered advantageous to the Government.
541* D. B. HARMONY, Chief of Bureau.

PROPOSALS.

EXHIBITION-BUILDING. [At Columbus, O.]

State-House, Columbus, O., April 15, 1886.

Sealed proposals for the erection of main exposition building on the new State Fair Grounds, Columbus, O., will be received at our office **until noon of May 4.** Proposals must be submitted on schedule blanks furnished by the Board.

Plans and specifications may be seen at the office of Terrell & Morris, architects, No. 45 North High St., Columbus, O., after Tuesday, April 23.

A satisfactory guarantee must accompany each bid that a contract will be entered into if the bid is accepted.

The Board reserves the right to reject any or all proposals, or to accept any part of any proposal.
540 Ohio State Board of Agriculture.

WATER-WORKS. [At Little Falls, N. Y.]

Sealed proposals will be received at the office of the Board of Water Commissioners of Little Falls, N. Y., **until Thursday, May 6, 1886, at 3 P. M.**

1. For constructing Beaver Creek conduit, dam and inlet chamber. Conduit about eight miles long. Amount of deposit required, $500.

2. For constructing distribution reservoir and about one mile of open canals. Amount of deposit required, $500.

3. For excavating and refilling trenches and laying the system of distribution complete, about sixteen miles. Amount of deposit required, $500.

4. For the valves and hydrants required for the system complete.

Four separate contracts in all.

The blank forms, specifications, and all other information will be ready on and after April 16, 1886. Application for the same to be made to Stephen E. Babcock, chief engineer, Little Falls, N. Y.

The Water Commissioners reserve the right to reject any or all bids. C. J. PALMER,
540* Secretary.

SCHOOL-HOUSE. [At Delhi, O.]

The Board of Education of the Warsaw Separate School District No. 1 will receive bids for excavation and limestone masonry to be done for the cellar and foundations of the school-house to be erected on the Warsaw Pike, in Delhi Township, Hamilton County, Ohio.

The plans and specifications for the above work are now on file at the office of Gustave W. Drach, architect, No. 227 Main St., Rooms 105 and 106, Cincinnati, Ohio.

Bids should be mailed to or filed with the Clerk of the Board, Thomas McKeone, Warsaw Pike, Price Hill, **on or before noon of Thursday, May 13, 1886.**

The Board reserves the right to reject any or all bids. By order of the Board.
THOMAS McKEONE,
541* Clerk.

PROPOSALS.

JETTY. [At Presqu'ile, Pa.]

Office of U. S. Light-House Engineer, Tenth District, Detroit, Mich., April 5, 1886.

Sealed proposals will be received at this office **until 2.30 o'clock, P. M., on the 5th day of May, 1886.** for furnishing the material and labor for building a jetty, 400 feet in length, of stone-filled cribs, for the protection of the shore in front of the Presqu'ile, Pa., light station.

For forms, specifications and all information apply to this office.

The right is reserved to reject any or all bids, and to waive any defects.

CHAS. E. L. B. DAVIS,
Captain of Engineers, U. S. Army,
540 Engineer Tenth Light-House District

IRON ROOF. [At Lynchburg, Va.]

Office of the Supervising Architect, Treasury Department, Washington, D. C., April 22, 1886.

Sealed proposals will be received at this office until 2 P. M., **on the 17th day of May, 1886**, for furnishing and fixing in place, complete, the iron roof, attic and tower beams, galvanized iron work, etc., required for the court-house, post-office, etc., building at Lynchburg, Va., in accordance with drawings and specification, copies of which and any additional information may be obtained at this office or the office of the superintendent.

Bids must be accompanied by a certified check for $300 for iron roof frame, beams, etc., and $100 for the galvanized iron work. M. E. BELL,
540 Supervising Architect.

PINE, TIN, ETC. [At Washington, D. C.]

U. S. Navy Pay Office, Washington, D. C., April 12, 1886.

Sealed proposals, in duplicate, endorsed "Proposals Ordnance," will be received at this office **until noon, May 10, 1886**, for articles required as follows, to be delivered at the Ordnance Department of the Navy-Yard, Washington, D. C., free of any expense to the Government, and subject to the usual inspection and conditions, viz.: Requisition No. 206, white pine; No. 210, Lake Superior Copper Straits tin.

Proposals must be made on official forms furnished (with schedules giving details) by this office. For expert and other information apply to navy-yard.

The right is reserved to reject any or all bids, and bids only from "manufacturers of, or regular dealers in, the articles which they offer to supply," will be considered.

Responsible persons must guarantee the prompt and faithful execution of contract, and the competency of the guarantors must be certified to before a United States officer. THOS. H. LOOKER,
Pay Director U. S. Navy,
541 Navy Pay Agent.

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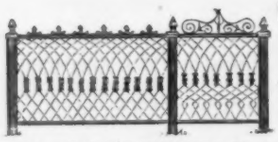

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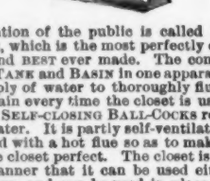

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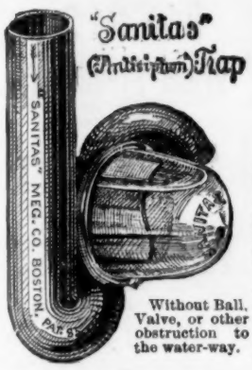

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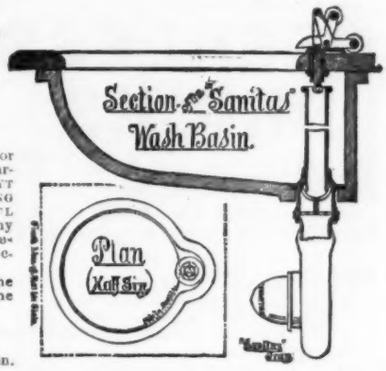

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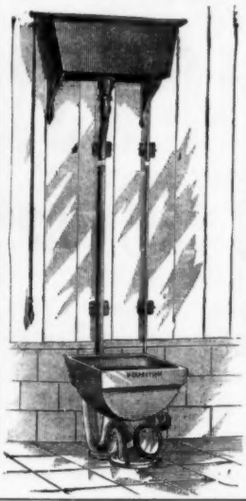

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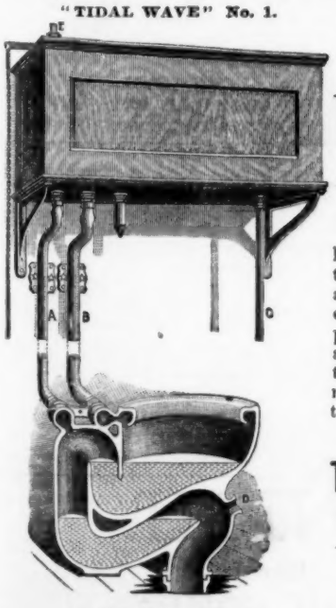

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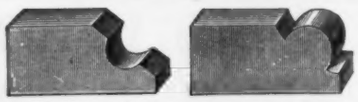

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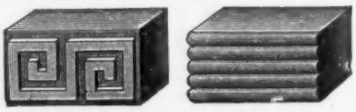

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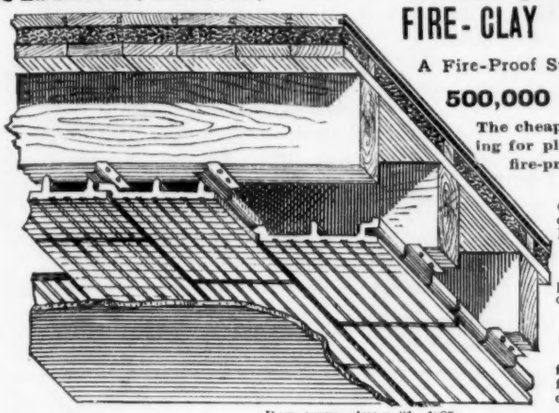

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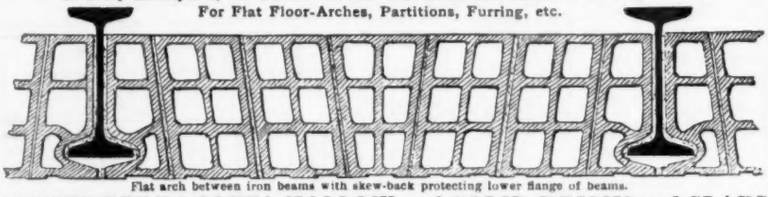

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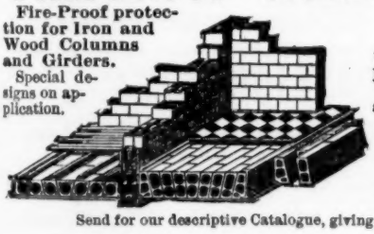

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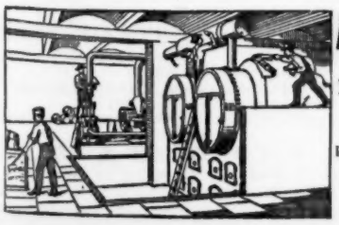

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For Doors.	Inch.	¾ to 1¼	1 to 1½	1 to 1¾	1 to 1¾	1¼ to 1¾	1½ to 2¼	1½ to 2½
Japanned.	Feet.	2 x 2	2½ x 2½	2½ x 2½	2½ x 2½	2½ x 2½	3 x 3	3 x 3
Flanges - - -	inch	3½	4	5	6	7	8	10
S'gle Actg,	per	$ 70	90	1 10	1 40	1 75	2 50	3 50
D'ble "	pair	1 40	1 75	2 20	2 80	3 50	5 00	7 00

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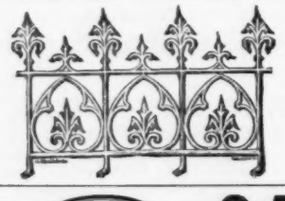

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Strongest, Cheapest, Best, and Always Fresh

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The American Architect and Building News

ADVERTISERS' TRADE SUPPLEMENT.

No. 47. SATURDAY, MAY 1, 1886. Volume XIX. No. 540.

AN ESSAY ON INTERIOR FINISH.

To every man about to build a house, either for his own occupancy or for rent, the question of interior finish is of great significance. In every other department of building, progress has been more marked than in this. Here, the house-builder of the nineteenth century has but little advantage over him of the age of Pericles. Indeed, the earlier age had certain decided advantages, for every year the difficulty is greater in obtaining well-seasoned lumber and competent carpenters. The rapid increase of building has created the former difficulty, and the variety and extent of work done by machinery has made obsolescent the old and more reliable type of "carpenters and joiners," so that the woodwork that is well put up falls off because it is badly seasoned, and the well-seasoned woodwork falls because it is badly put up.

It will be borne in mind that the "finish" of a room, after the plaster is done, includes the following items: Jambs, to which doors are hung; Bases or wainscoting around the room; Architraves around doors and windows.

In all but the most costly work, the jambs are now, and always have been, of wood, and this is true for obvious reasons. For the rest of the "finish," there has been used: wood, cement, tiles, cast metal or marble.

In wood there are the following objections: The readiness with which it is defaced; inflammability; cost of refinishing it when injured; shrinkage and expansion; difficulty of cleaning, and the ultimate dirt and rustiness due to age.

Cement, however made, soon loses its polish from contact with the sulphurous acid of the smoke-laden air, and when this happens it is open to all the objections of wood, except that of inflammability.

Tiles are costly, and can with readiness be used for wainscoting alone. Any encaustic material must necessarily be made in small pieces, which makes it impracticable for long lines of mouldings, like bases, architraves, etc., except at great cost. Even when used in this way, the tiles must be glazed to retain their surface intact, and this means, even with tiles of but one color, very considerable cost, while in various colors and patterns the cost is much greater.

Any material used for caps and bases, when tiles form the wainscoting, is also costly, wood being but a cheap and inefficient material for these purposes, coming as it would at points of greatest exposure. Encaustic tiles are also difficult of application, owing to the variance in size caused by the burning. They are, moreover, friable and easily broken by a sharp blow.

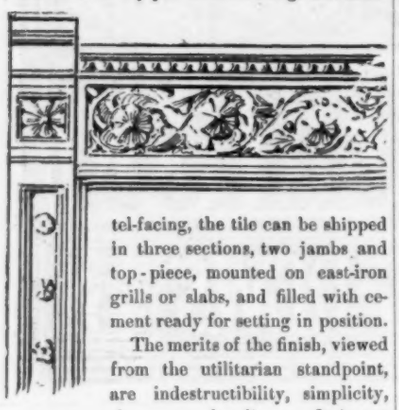
The merits and defects of such materials as marble, granite, etc., it is scarcely worth while to discuss, because the expense involved in each of them is so great that they are practicable for costly work alone.

It will be borne in mind that the objections noted above, which are serious even in a private dwelling, become still more serious in any building devoted to commercial uses, and, in this class, still more objectionable if the buildings be fire-proof.

The metallic tile was devised to obviate all of these objections, and it will be seen at a glance that it accomplishes the object of its design. Sheets of brass are taken, which, for wainscoting, are stamped into tiles of any size and design by a die; and for bases, architraves, etc., are drawn through a mould of any pattern and in any lengths. The tiles and mouldings thus formed are either left their natural color, or, by a chemical bath or electric batteries, are colored to any desired tone. The thin metal used for these purposes is greatly stiffened by the patterns stamped in it, and is made absolutely rigid by the method of filling and setting in place.

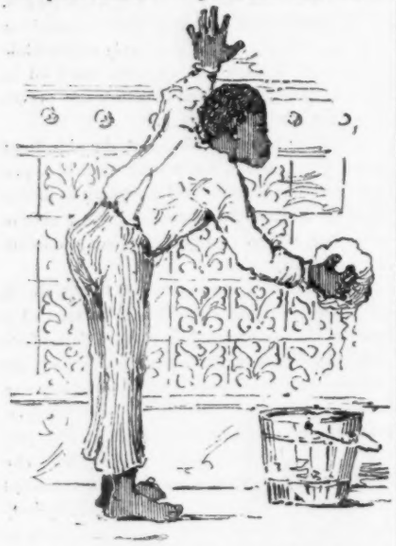
This finish can be applied to any surface. Each tile, when it leaves the die, has this form, with flanges turned back from the face three-eighths of an inch. In treatment for fire-proof buildings, these flanges are bent inwards, forming a dovetail; the tiles are then filled flush with gauged mortar or cement, the surface being left rough or scored, forming a positive key for adhesion to the plaster wall. For application to the ordinary building, or for general decoration, the tiles are filled with wood-blocks three-eighths of an inch thick, and can be readily applied with ordinary wire brads, or fastened with ornamental nails at the corners, the back or lining being common matched flooring, set flush with the face of plastering above, and nailed firmly to the studding or furring strips.

This system of decoration is less expensive than the ordinary panel wainscoting. For man-



tel-facing, the tile can be shipped in three sections, two jambs and top-piece, mounted on cast-iron grills or slabs, and filled with cement ready for setting in position.

The merits of the finish, viewed from the utilitarian standpoint, are indestructibility, simplicity, cheapness, cleanliness. It is not destroyed by fire, nor injured by rough usage. Any mechanic can put it up, as the tiles are of a uniform size and thickness, and require no selection. It is easily cleaned with soap and water, is readily dusted, and does not, like wood, suffer from the heated furnace or the performances of gentlemen like this —



nor does it house "gentlemen" like these —

and to the pests of all good housekeepers — rats and mice — it is a perfect barrier.

This finish can be made of any design, special designs costing but little more than the stock patterns. The range of its color is from the deepest tone of antique bronze to the color of silver.

Its variety of uses is almost infinite. For wainscotings, architraves, panels of doors, ceilings, mantel-facings, and many other items of internal and external decoration, it is almost unrivalled.

The numerous effects of color, design, and the variety possible, make this system of finish applicable equally to the simplest and the most costly work. It is no less valuable in its applicability to the artistic decoration of private dwellings than to the finish of all classes of commercial structures. To every one its merits are apparent.

We are prepared to make any quantity of these tiles for wainscotings or other finish on short notice; to execute orders for special

designs and sizes, and will be pleased to send samples and submit estimates on short notice.

UNION BRASS MANUFACTURING CO.,
CHICAGO, ILL.

HYDRAULIC-PRESS BRICK.

CAREFUL attention is asked to the enclosed certificate of the Chicago Forge and Bolt Company of Chicago, showing the crushing strengths of bricks from various parts of the United States.

These tests were made in a careful and entirely impartial manner. The samples, covered on the flat sides by wet paper gasket board, were placed *whole*, between two large cast-iron plates, with planed faces, in a powerful crushing machine (constructed for such work), formerly in use by the American Bridge Company.

Full descriptions of the samples, giving names of the manufacturers, and other particulars of interest, are appended.

The claim of the Hydraulic-Press Brick Company, that the bricks manufactured at its works are the best in the country for any purpose for which bricks are used, is fully justified.

REPORT OF TESTS MADE ON BRICK.

TEST No.	MARKS.	STRAIN AT FIRST FRACTURE.	ULTIMATE STRENGTH.
1	A. No. 3.	62,400	114,000
2	A. No. 2.	24,000	168,000
3	A. No. 1.	90,000	192,000
4	H. P. No. 8.	312,000	390,000
5	H. P. No. 6.	216,000	324,000
6	H. P. D. R.	180,000	342,000
7	H. P. P.	252,000	432,000
8	No. 8.	28,800	192,000
9	I. 7.	30,000	168,000
10	S. 9.	78,000	138,000
11	C. O. B. 4.	24,000	156,000
12	M. 10.	12,000	114,000
13	Z. A.	19,200	132,000
14	Trenton.	32,400	216,000
15	Phil.	12,000	132,000
16	Mil.	13,200	126,000
17	Balt.	15,600	192,000
18	Chicago.	10,800	114,000
19	Toledo.	26,400	102,000
20	P. & K. Ind.	36,000	156,000
21	H.	56,400	132,000
22	A. M.	57,600	123,600
23	Union.	10,000	210,000
24	T.	4,800	258,000

I hereby certify that the above is a true and correct statement of test made by me this day with the testing machine of the Chicago Forge and Bolt Company.

[Signed] C. WEATHERSEN, *Superintendent.*
CHICAGO, March 23, 1886.

CHICAGO, March 23, 1886.

I hereby certify that the following is a true and correct description of the bricks furnished by me to the Chicago Forge and Bolt Company this day to be tested:

A. No. 3, known as Anderson No. 3; A. No. 2, known as Anderson No. 10; A. No. 1, known as Anderson No. 14, were brick from the Chicago Anderson Press Brick Company.

H. P. No. 8, H. P. No. 6, were press brick from the Hydraulic-Press Brick Company, St. Louis.

H. P. D. R. was common dark red brick from Hydraulic-Press Brick Company, St. Louis.

H. P. P. was paving brick from the Hydraulic-Press Brick Company, St. Louis.

Z. A. was re-pressed brick from Townsend & Company, Zanesville, Ohio.

Trenton was re-pressed brick from Fell, Roberts & Company, Trenton, New Jersey.

Phil. was re-pressed brick from the Peerless Brick Company, Philadelphia.

Mil. was from Burnham & Company, Milwaukee.

Balt. was repressed brick from Burns, Russell & Company, Baltimore.

Chicago was a common Chicago brick, manufactured on the "Chambers" machine.

Toledo was a Stock brick from the Toledo Brick Company.

P. & K., Ind., was from Purington & Kimbell Brick Company.

H. was from W. E. Hinchleff & Company.

T. was from Tiffany Brick Company, Momence, Illinois.

[Signed] J. J. LOCKWOOD.

CHICAGO, March 23, 1886.

I hereby certify that the following is a true and correct description of the bricks furnished by me to the Chicago Forge and Bolt Company, this day to be tested:

No. 8 was a semi-dry clay brick from Ittner Bros., St. Louis, made by the "Andruss" machine.

I. 7, was the same.

S. 9, was a semi-dry clay brick from the Standard Press Brick Company, St. Louis, made by the "Kennedy" machine.

C. O. B. 4, was a semi-dry clay brick from the Columbus, Ohio, Brick and Terra-Cotta Company, made by the "Whittaker" machine.

M. 10. was a hand-made re-pressed brick, made by the Menomonie Pressed Brick Company of Menomonie, Wisconsin.

A. M. was a dry-clay brick from Anoka, Minnesota.

Union, was a tempered-clay brick, from the Union Press Brick Works, of St. Louis, made by the "Sword" machine.

[Signed] H. W. ELIOT.

A VALUABLE CORRECTION.

FEELING that it is the desire of the management of your valuable Journal to give to the growing art sentiment of the American public only correct ideas about art, I ask privilege of space to controvert a statement recently made in a New York journal of art, of April issue, concerning "Stamped Leather."

The article commences, "Some beautiful effects can be obtained in stamped leather, but the modern work in that material is of so dubious a permanency that its general use can hardly be recommended as yet."

I endorse the writer's expression about "modern leather" so far as he has investigated, but affirm he has not gone far enough. Nine-tenths of the "modern leather" is "hardly fit to be recommended as yet." What is the reason of this? In brief, it may be summed up as follows: The demands of our people are for beauty and cheapness, imitations and mere "looks of the thing," rather than serious works with quality. The former work is the output of the machine, and means

the supplying of the thousands, while the latter requires slow handwork, careful selection of material, tanning and staining, and reaches only the wealthy few. I would have the writer to know and the thousands of readers of your Journal to understand that in New York there is a leather-maker whose work equals that of the old masters in all respects, and surpasses it in its pliability.

I refer to the products of Mr. Charles R. Yandell.

This gentleman has been steadily at work in his beautiful way trying only to produce a worthy material for upwards of eighteen years, and the results have been, so far as durability and art goes, perfectly satisfactory.

Of course, his patrons are few and among the wealthy class, and his work is rarely seen in any of the furniture houses.

I am in no sense desirous of advertising any particular house, but I do feel that true honest art, when discovered, should be made public and fostered.

If you care to print the enclosed letter it will most completely vindicate the position I take and give credit to whom credit is due.

FRANK T. ROBINSON.

LONDON, W., August 13, 1885.

CHARLES R. YANDELL & CO.: —

Gentlemen,— I have the pleasure of informing you that the commission of the International Industrial Exhibition in London have just awarded to you their highest award, viz., a gold medal, for the art leather-work for walls, screens, chairs, etc., exhibited by you in this exhibition.

Permit me also to add my warmest congratulations on this further public recognition of the value of your achievements in this branch of art and of the success of your efforts, spread over many years, to restore to civilization the long lost one of the finest arts of the Middle Ages.

Nor, can it be otherwise than gratifying to you as American citizens to know that on *American soil alone* is now revived the beautiful combination of painting and engraving on leather, which three centuries ago was practiced by the artists and skilled craftsmen amongst the Venetians, the Florentines, Spaniards, the Flemings and the Moors; and that this exquisite art-work which, through its costly production, was especially confined to the Mediæval churches, palaces, castles, mosques, and alhambras can now, through your leather, also find a place in the homes of American citizens of culture and refinement.

I may add that the exhibit has been a constant object of attraction here, presenting as it does so many beauties of interest to the connoisseur both from the artistic and the historic point of view.

Believe me, Respectfully yours,
WM. M. Y. MAXWELL, L.L.B.

THE NEW YORK ARCHITECTURAL TERRA-COTTA COMPANY.

THIS company has fulfilled the first part of the promise made in their prospectus, issued January 28 last, in a manner which gives great assurance that they will be able to do *all* that they then promised. Saturday, April 24, was the forty-sixth working day since the first brick was laid, during which time a building 177′ x 130′, six stories in height, and containing more than a million of brick, has been erected, in spite of very inclement weather and great difficulty in procuring material.

In addition to the building proper, there have been built four kilns, containing several hundred thousand brick, and capable of turning out one-half the capacity of the factory. Four more kilns will be begun at once, and pushed rapidly to completion.

The engine, boilers, and other machinery, all of the latest and most improved patterns, and designed and built expressly for this company, are now complete. The works were so far advanced on the 10th day of April as to enable the company to begin the making of terra-cotta, pressing the clay in moulds that had been made in temporary shops erected on the grounds. The kilns were also so far advanced that the fires were started for drying them previous to loading and burning with terra-cotta.

To have accomplished all this in ninety days, out of which only forty-six working days have been available, implies energy and resources that should entitle the company to the fullest confidence.

A description of their building has already been published. Its location, easy of access from any part of Manhattan or Long Island, not only enables the company to deliver work with despatch by trucks or boats to New York city and Brooklyn, or by rail or water to other points outside, but enables architects and builders in the vicinity to inspect the work in process of production — a great advantage in promoting and ensuring satisfactory execution. The company also makes a special point of affording the profession every possible facility for supervising the work in which they may be interested, having even provided a draughting-room for their accommodation.

No material is more susceptible of fine handling than clay, and none so sensitive to ignorant handling either by artist or mehanic. The New York company have secured an efficient staff in all departments, headed by that veteran clay-worker James Taylor, late of the Boston company, who, by his productions, is favorably known to architects and builders wherever terra-cotta is used. All that his long experience in manufacturing, and sixteen years' service in meeting the demands of our local markets could suggest, have been adopted in the construction and equipment of the new works, and it is a source of pride and satisfaction to the officers of the company that the metropolis of the Union now possesses the largest and most completely-appointed establishment for the manufacture of terra-cotta in this country.

The company have secured offices in the new Potter Building, which is the most elegant and commodious structure of the kind in New York city. In the matter of location, a better could not be desired. Almost every surface-car passes the door, or within a stone's throw. Stations of the Sixth Avenue and Third Avenue elevated lines, and the New York approach to the Brooklyn Bridge are within five minutes' walk. There is not a building in the city more accessible to citizens or strangers.

The works being now fully in operation, the company is taking orders for work, and is prepared to promise and guarantee the literal fulfillment of any undertaking which they assume. The company have embarked in this enterprise with the determination not only to put on the market a terra-cotta superior in quality and artistic finish to any attainment in the past, but also to do away with the vexatious delays that have hitherto occurred in the execution of orders, and which have more than any other cause prevented the more general use of this most valuable material. If the energetic manner in which the company have built and equipped their own works may be taken as an earnest of their performance in the prosecution of their business, their success would seem to be assured.

N. Y. ARCHITECTURAL TERRA-COTTA CO.,
POTTER BUILDING, NEW YORK CITY.

ROYAL REVERSIBLE SASH.

IN the ordinary sash in general use, the danger and inconvenience attendant upon the cleaning of the outer side of windows forms a serious objection, to overcome which has long been the aim of inventors.

The Royal Reversible Sash remedies in the simplest and most effectual manner this defect. It enables the cleaning of the outer side of windows with the same facility as the inner side, without removal of stops or loosening of weights.

The sash is so constructed as to move inwards, and the operation of cleaning is performed while it is in a horizontal position.

The construction is so simple that any one can operate it, and the device may be attached to old as well as to new sash.

In presenting this improvement to the building trade, we feel that we are supplying a long-felt want, and that the slight increase in the cost of sash under our system is largely compensated for by its great advantages. All buildings laying claim to modern improvements should be furnished with this sash, and its use on the upper stories of all classes of buildings ought to be adopted as a measure of safety.

Price per window for sash, 1¾ in. thick, $3.00.
" " " 2¼ " $3.50.

ROYAL REVERSIBLE SASH CO.,
565 SOUTH CANAL STREET, CHICAGO, ILL.

NOTES.

THE rage for architectural illustration, which has of late beset all sorts of publications, has declared itself in a new place, and if architectural scrap-books are to be kept complete, the catalogue of the Myers Sanitary Depot, 54 Beekman Street, New York, must be pillaged, for here are to be found illustrations of some of the many buildings for whose proper sanitary condition this well-known concern has made itself responsible by declaring that the several buildings shown have been more or less completely equipped with plumbing-apparatus supplied by itself.

Like most catalogues, it has its good and bad points: of these last, the greatest is the scarcity of sectional views, which, to the architect at least, have the most value. The good points include the apparatus described, amongst which we are glad to see a simple form of tank siphon — Wilson's quick-charging siphon — though we do not see why it should cost thirty or forty dollars. The Dececo flush-pot is another apparatus which has its use; and the McFarland basin is probably as serviceable as Mr. Putnam's, from which it is so evidently copied.

Messrs. E. A. Jackson & Brother have been the victims of a slight mishap, which we regret for their sake, though as it points a moral, it may be of use to others. Some weeks ago they had their advertisement on our twelfth page reset, and when it came to stating their address they wrote "77 Beekman Street," assuming, evidently, either that the printer would add the address, or that all the world must know that Beekman Street is in New York. As to the first assumption, they should have remembered that a printer's first law is to "*follow copy*," and he would not feel himself allowed to add anything to the address not given in the copy. And as to the second assumption, it seems they reckoned without their host, for some low "provincials" have been found who imagine that Beekman Street is in Boston, and have sought them at that address.

This reminds us that a short time ago we discovered that the advertisement of a Philadelphia furnace-maker had been printed for the greater part of his contract period *without any address at all*. Here, too, the printer "followed copy," and the proof-reader assumed that the advertiser was one of those world-famed men whose address is known to every postal clerk, or that he had placed his goods in every shop and was advertising for the benefit of the retail trade. Need we say that we were not surprised to find that this advertiser declined to renew his contract with us, because he "had not heard from his advertisement in your paper!"

ANNOUNCEMENT.

February, 1886.

WE have arranged with Mr. Orrin D. Person, No. 123 Fifth Avenue, to represent us in New York City and vicinity.

Mr. Person will give prompt attention to the wants of the architects and builders, and will receive such assistance from the Home Office as shall be needed to give the best possible service to our customers.

Any communication sent direct to this office, or to Mr. Person, will receive prompt attention.

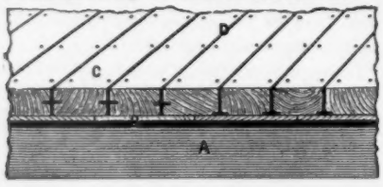
BOSTON TERRA-COTTA CO.,
No. 394 FEDERAL STREET, BOSTON.

DYCKERHOFF
PORTLAND CEMENT

Is superior to any other Portland Cement made. It is very finely ground, always uniform and reliable, and of such extraordinary strength, that it will permit the addition of 25 per cent more sand, etc., than other well-known Portland Cements, and produce the most durable work. It is unalterable in volume and not liable to crack. 8,000 barrels have been used in the foundations of the Bartholdi Statue of Liberty, and it has also been used in the construction of the Washington Monument at Washington. Circular with Directions, Testimonials and Tests sent on application.

E. THIELE, 78 William, St. New York,
SOLE AGENT FOR THE UNITED STATES.

DOLBEARE'S
Water-Tight Wood Floors.
400,000 sq. ft. now in actual use.



Patented June, 1882.

Architects, Builders, and Owners find in these an improvement long sought for. They combine lightness and durability with absolute water-tight qualities. With these floors in stables, public or private buildings, mills, ware-houses, hotels, breweries, slaughter-houses, etc., there can be no leakage of water or foul smells. They can be of any thickness desired, and will save more than their entire cost in preserving furniture, goods, and ceilings, in case of flooding of floors by fire or bursting or leaking of water-pipes. The filling is both adhesive and elastic, and allows for shrinking, expansion, and settling, etc., and brings no strain whatever on the walls, as is the case in caulking.

Good Agent wanted at the West.

OFFICE OF SAMUEL D. KELLEY, ARCHITECT.
BOSTON, Jan 21, 1885.

W. L. DOLBEARE, Esq.,

Dear Sir: — I have used your Improved Water-Tight Wood Floors, for stable purposes, for the past three years, to the extent of about forty-three thousand (43,000) square feet, and have in each case given complete satisfaction. Yours, etc., S. D. KELLEY.

VINAL'S PARK RIDING ACADEMY AND STABLES.
Cor. West Chester Park and Newbury St.
BOSTON, Dec., 1884.

Dear Sir: — The Patent Floors you put into my building eighteen months ago have proved *perfect in every respect*, one floor in particular, which has eighty stalls, with riding academy above and carriage floor below, has had a severe test, but not once have I found a leak, therefore, I can unhesitatingly recommend Dolbeare's Patent Floors.

Yours, etc., W. D. VINAL.

JOHNSON'S EXTENSION STABLES.
Cor. Curve St. and Broadway Extension.
BOSTON, Dec. 15, 1884.

W. L. DOLBEARE,

Dear Sir: — Your Water-Tight Wood Floors put in for me two years since has proved a *perfect success*. You are at liberty to refer to me at any time in regard to it. Yours respectfully, GEO. S. JOHNSON.

Orders respectfully solicited and personally attended to by addressing

W. L. DOLBEARE,
No. 522 Atlantic Avenue, Boston.

Drawing-Office.

Drawings rendered in line or color with reasonable despatch.

ADDRESS
Editors of the American Architect,
211 Tremont Street, Boston, Mass.

10

FOR A SASH OF 250 LBS.

"MORTON'S METAL"
(Registered Trade-mark, May 1st, 1883.)
Cable and Champion Sash-Chains
and Patented Attachments.

The most **RELIABLE** and **CHEAPEST** article in the market for suspending
Window-Sashes.
HAS GREAT TENSILE STRENGTH,
Can be easily applied to any window, and gives SATISFACTION wherever used.
Samples sent to any ARCHITECT free on application. Now in use in all the leading cities throughout the United States.

MANUFACTURED ONLY BY
THOMAS MORTON,
65 ELIZABETH ST., NEW YORK.

1

CHAMPION CHAIN.

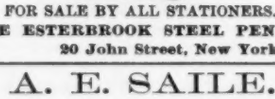
ARCHITECTS, BUILDERS, CONTRACTORS
Should Investigate the Merits of
THE ORMSBY SPRING ROLLER BALANCE.

IN NEW FRAMES.

IN OLD FRAMES.

SUBSTITUTE FOR WEIGHTS and CORDS.
ORMSBY SASH HOLDER CO.,
92 Utica Street, - - BOSTON, MASS.
(Opposite B. & A. Depot.)

ESTERBROOK'S STEEL PENS



FOR SALE BY ALL STATIONERS.
THE ESTERBROOK STEEL PEN CO.
26 John Street, New York, N. Y.

A. E. SAILE.
Architectural Sculptor.
Wood Carving and Modelling.
49 University Place, NEW YORK.
Interior Decorations in Wood and Plaster.

Something New for the Stable.

Read's Patent Harness Bracket.

An Article long wanted but never before made.

Holds the whole harness, takes no more room than the ordinary hook or peg, can be used for both single and double harness. Gives the harness-case a neat appearance, as it carries the harness up uniformly in width with the saddle, beside keeping the bridle and breastplate in their proper shape. They are neatly japanned, with gilt facings. Price **$18** per dozen. Are now in use in over 100 first-class private stables in and about Boston.

Each bracket lettered "**J. J. Read, Boston, Mass.**" For sale by dealers everywhere.

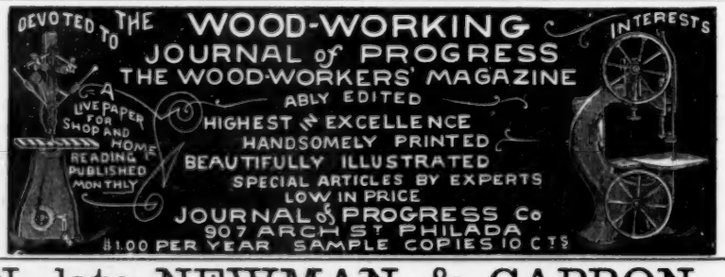
Indorsed and approved by the following named gentlemen, all of whom have them in use:

Boston; R. H. White, J. M. Sears, J. T. Morse, Jr., Thos. Motley. Cambridge: F. A. Kennedy. Portsmouth, N. H.: Hon. Frank Jones. Milton: H. P. Kidder, Col. H. S. Russell, J. M. Forbes. Dedham: A. W. Nickerson. Newton: J. C. Potter. Salem: Dr. W. Saunders. Waltham: J. H. Ellison. Readville: C. G. White. Beverly: Dr. Chas. Haddock. Swampscott: C. P. Curtis.

The public are cautioned against all similar brackets, not marked with my stamp, as such brackets are infringements of patents held by me.

Also cedar-top riding-saddle bracket. Price $3.50 each. An whip-rack for English coach and straight whip combined. Price 50 cents each.

JAMES J. READ, 13 Tremont Row, Room 10.



A. G. NEWMAN, late NEWMAN & CAPRON.
MANUFACTURERS OF
Fine Bronze Hardware, Bank, Office and Stoop Railings in Bronze or Brass. Antique Furniture-Trimmings. Electrical and Mechanical Bell-Hanging Burglar-Alarms.
Warerooms, 1180 BROADWAY. **Factory, 157-163 WEST 29th STREET, NEW YORK, N. Y.**